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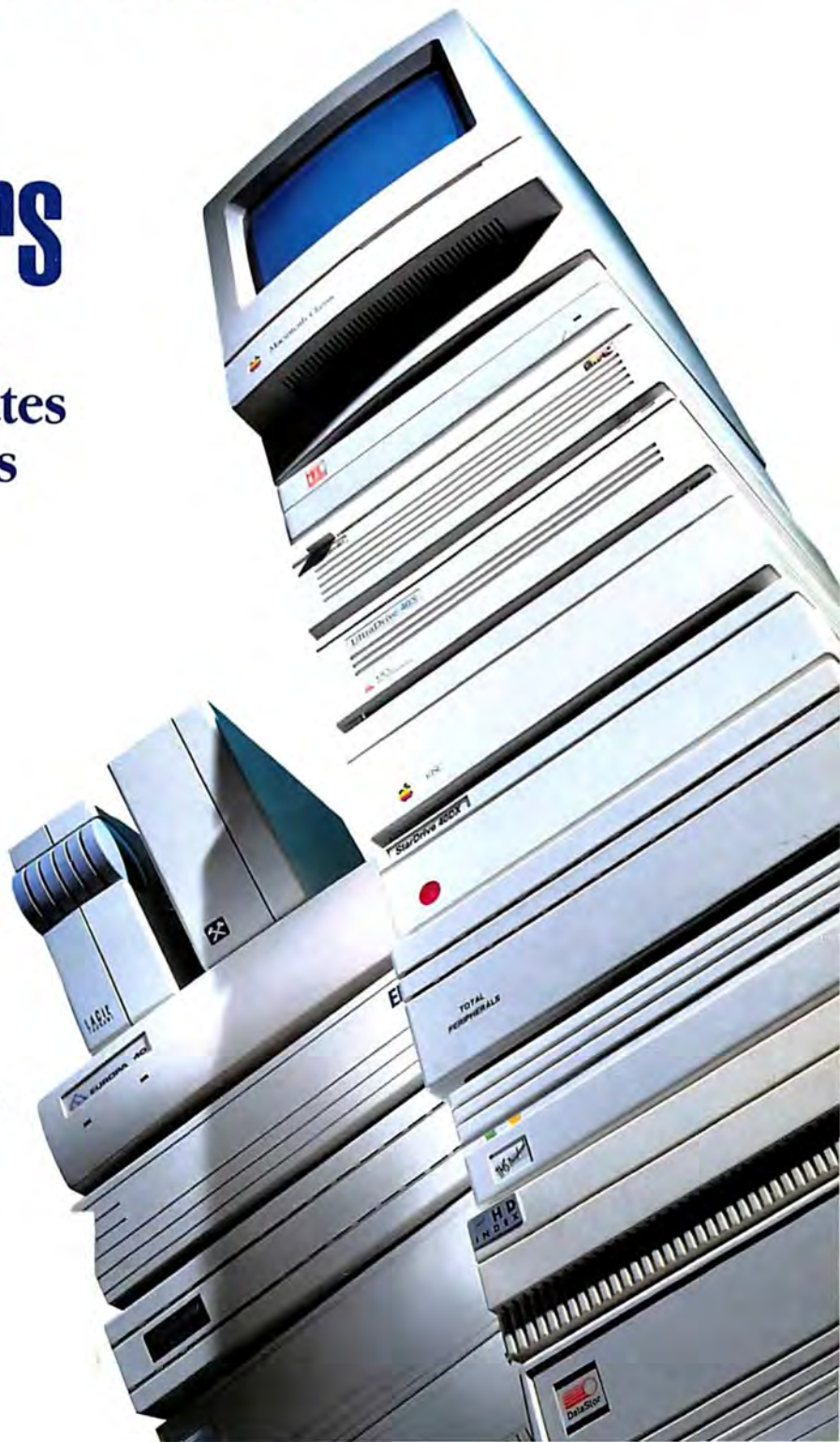
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- **DISK-RECOVERY SOFTWARE:** How to survive your first crash

- **MEMORY UPGRADES:** The cheapest, easiest power boost for your Mac

- **SNEAK PREVIEWS:** Kodak's printer/copier, Pixar's 3-D Showplace, and new compression tools



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You do it by th



inking small.



When we introduced Microsoft® Word six years ago, we weren't planning on making history.

We had just one goal, and a fairly simple one at that: to make a word processor that suited people's needs.

Then again, we knew that the people we wanted to suit were a wildly diverse, independent lot: Mac® users. So it made sense to let them tell us exactly what to put into Word.

Which they did.

First, there were some folks who didn't like tabbing much. Fair enough. For them, we developed Tables—an easier way to set up side-by-side paragraphs, columns of numbers, even forms. No tabs. No hassle.

Then we heard from a few more people. "The Tables gig is working," they said. "Now, about this text-numbers-graphics combo all in one document..."

We made that simple with "warm links." Once you've linked Microsoft Excel data to a document, keeping that document updated with the latest Microsoft Excel figures is easy. Just click your mouse.

Then there were those senders of mail, who didn't want to click-click-click-click-click-click. So we built support for Microsoft Mail right into Word. Now, with just a click, everyone stays in the loop. And work in progress *stays* in progress.

Apparently, listening to what people want is a pretty good way to design software.

How else can we explain Word 4.0 being the most popular word processor in Mac history?

And those cards and letters are still coming. "Listen," someone'll say. "In case you guys are working on the next Word..."

Which we are. In fact, if you've got some input for us, feel free to drop us a line. Or if you'd like to find out more about Word, call us at (800) 541-1261, Dept. N26.

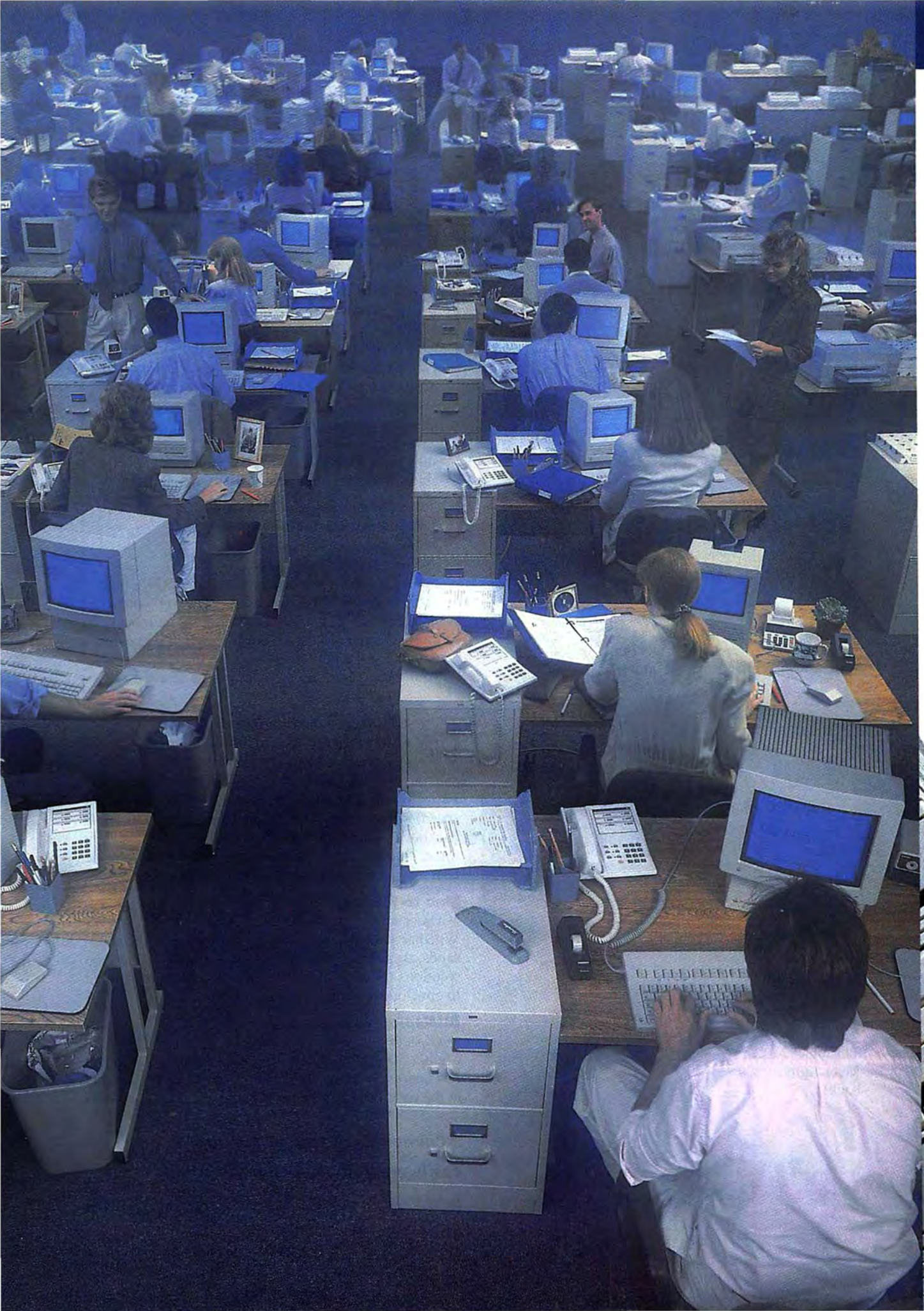
Our goal is still simple: to make Word the best word processor around. With the latest technology—translated into human terms, of course.

After all, we're only making history because we make word processors the way you like 'em.

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You don't become the most popular word processor in Mac history by thinking big.



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Cover photo by Henrik Kam



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MacUser LABS — Life Begins at 40 Megabytes: Small Hard Drives
BY WINN L. ROSCH AND THE MACUSER LABS STAFF
An external hard drive is one of the most important peripherals you'll ever buy. MacUser Labs tested 32 drives in the 40-to-50-megabyte range. Our evaluations reveal significant differences in speed, physical design, power supply, SCSI connection/termination, software, and service. Check the results to find out which units provide safe, affordable storage for your data. .. **Buyer's Guide 4**

MacUser LABS — Surviving the Crash: Hard-Disk Recovery
BY JACKIE TAYLOR, PAUL WOLF, AND THE MACUSER LABS STAFF
Someday your hard disk will go down. Whether your data goes with it depends on how well you've prepared for disaster. MacUser Labs purposely crashed some disks to discover which of five contending programs could best save the day — and your data. **Buyer's Guide 42**

MacUser LABS — Building a Better Network with EtherTalk-to-LocalTalk Routers
BY KURT VANDERSLUIS, PAUL KENT, AND THE MACUSER LABS STAFF
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SIMMple Pleasures
BY OWEN W. LINZMAYER
Memory upgrades are cheaper, easier, and more important than ever before. Here's how to buy the right SIMMs at the right price for the right Mac. **194**

'Pointers to the future are most easily grasped by the handles of the past.' **229**

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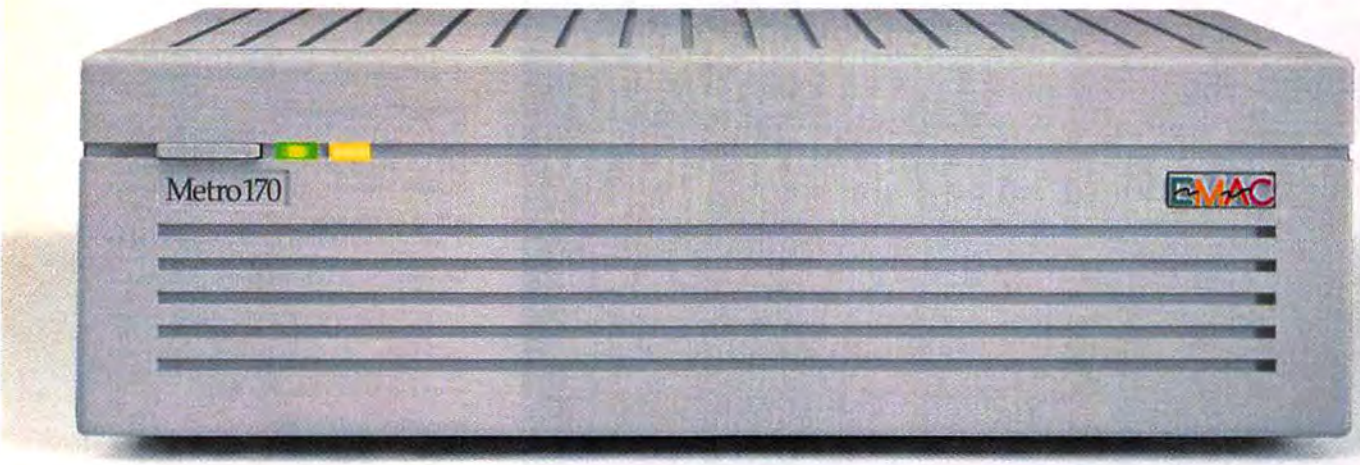
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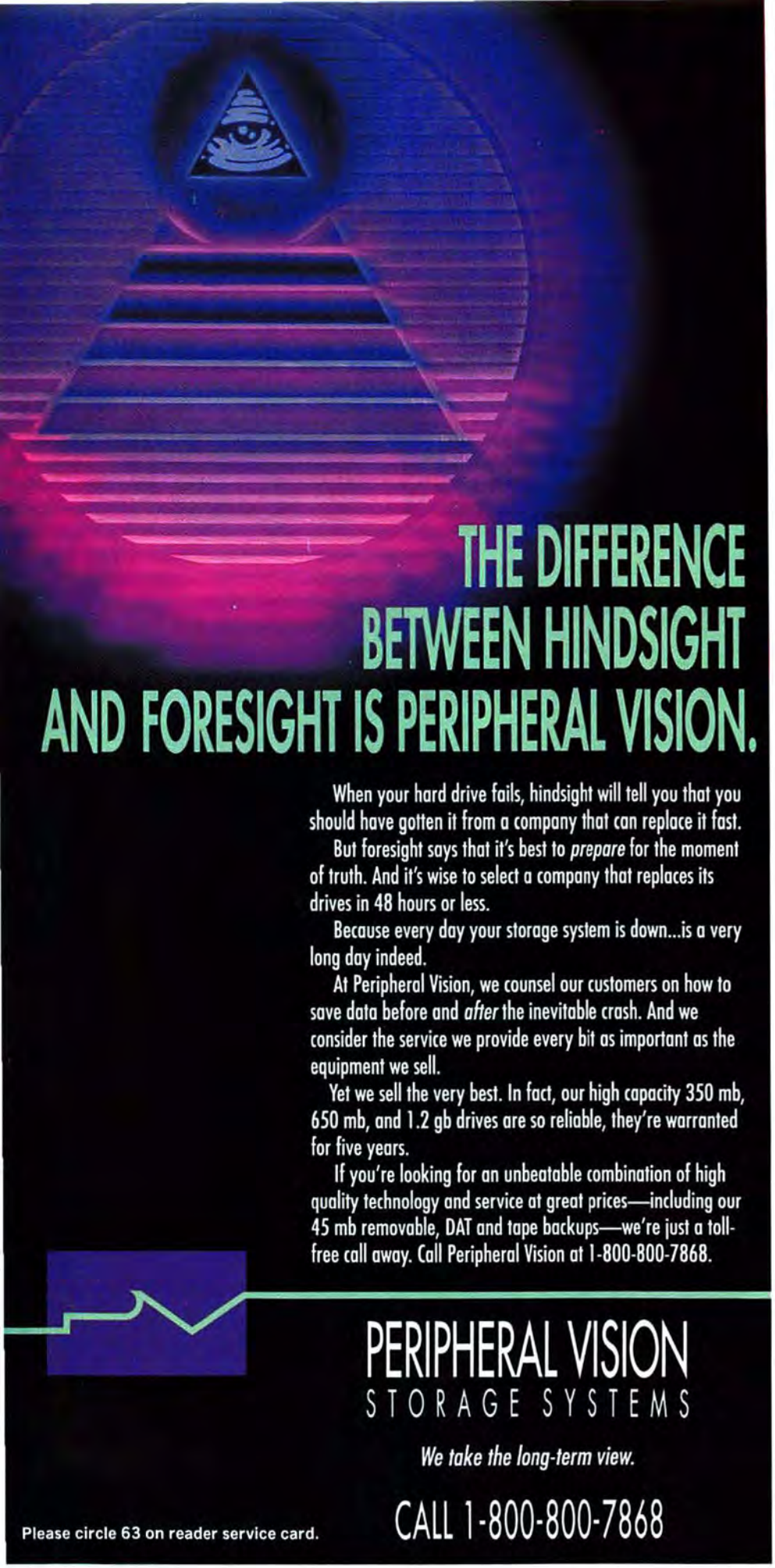
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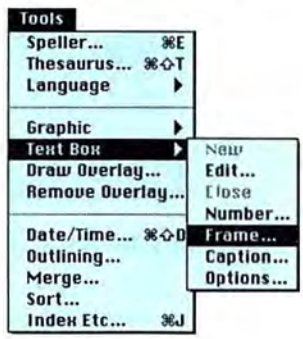
Every once in a while a new product comes along that sparks the same kind of excitement you may have experienced with your first Macintosh (you stayed up half the night, right?). As we've shown new WordPerfect® 2.0 to Macintosh users around the country, we've seen a very similar reaction. First eyes open wider. Then heads start to nod. Followed by grins that stretch dimple to dimple.



Here are some of the more graphic improvements.

We built a graphics and drawing package right into the program. With WordPerfect 2.0, you don't have to leave your document to incorporate graphics. Inside your text box, you can create, edit, size, scale and crop graphic figures just by clicking "graphics" or "draw" on the pull-down menu. The palette includes all of the standard drawing tools, plus Bezier curves, polygons and a free rotation tool.

WordPerfect 2.0 also lets you create text boxes. You can change font size and attributes. Then you can drag your text box wherever you want in your document and the rest of your text will wrap around it automatically.



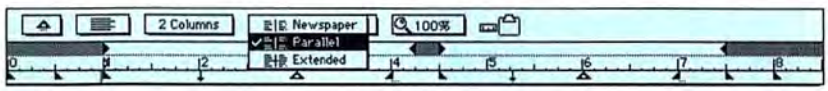
The list of new features could fill a page. Or up to 24 columns.

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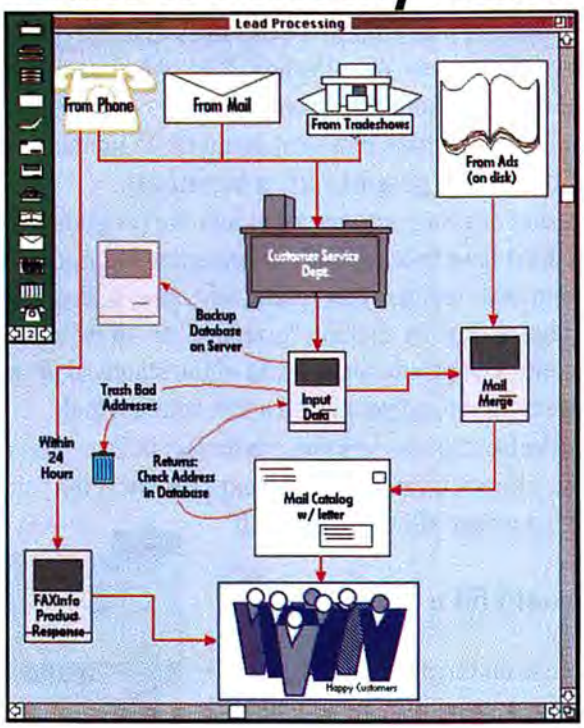


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About MacUser

Apple's Living Lab

Jacksonville, Oregon. Home to darn good apple pie and Apple's Sociological Small-Business Experiment. Looking for a small town with businesses that could run solely on Macs, Apple seeded the Applegate Valley town of Jacksonville with Macs last September. Five months later, *MacUser* went to Jacksonville to see the effect on the town.

Timing was awkward. Some residents were miffed at the February issue, just out then, and in particular at our very own John C. Dvorak. Somehow, they didn't appreciate being called a podunk burg. And you can't blame them.



In the town that Apple seeded with dozens of Macs, Dale Staib, fire-department chief, keys in the day's fire report.

Granted, with a population of 2,500, Jacksonville is the kind of small town where everybody knows your name, a place where people get excited over a Christmas-light competition. And granted, the town is visibly little changed from its gold-rush founding in 1851 — most of the town's 60 small businesses are housed in buildings that are more than 130 years old.

But it was a big deal to this small town when Apple arrived with $300,000 worth of Macs, printers, scanners, and modems and when other companies (including *MacUser*) chipped in with software and magazine subscriptions. The systems were installed at more than 30 locations, including the Peter Britt music festival, a printing firm, a winery, restaurants, bed-and-breakfast establishments, a medical center, hotels, City Hall, the police and fire departments, the public library, and the elementary school.

It was not the first exposure to computer technology for Jacksonville. Most of the people we interviewed had set aside PC clones or Mac Pluses for the free Mac Classics, LCs, and IIsi's. One manager we spoke to had subsequently bought a Mac and modem for her home and was in the process of setting up Timbuktu so she could access the office machine from home.

Staying up all night to work on a Mac is common. The library and the school provide public access to Macs, but demand has outstripped supply. Jacksonville's Mac users troubleshoot problems together. The fact that most have the same machines and software reinforces the sense of community that is a fact of life here. "I don't worry if I'm not an expert on a certain package," one person said, "because someone across the street will be."

What we found most fascinating about the Jacksonville experiment is that Apple has introduced a shared technological base into a real-life community. Most communities with a mutual interest in computer matters are artificial, arbitrary, or ad hoc. Jacksonville's businesses were a community before the technology arrived, and they have now become a Mac user group as well. What will a real community do when it has an uncommon technology in common? Should be interesting to watch.

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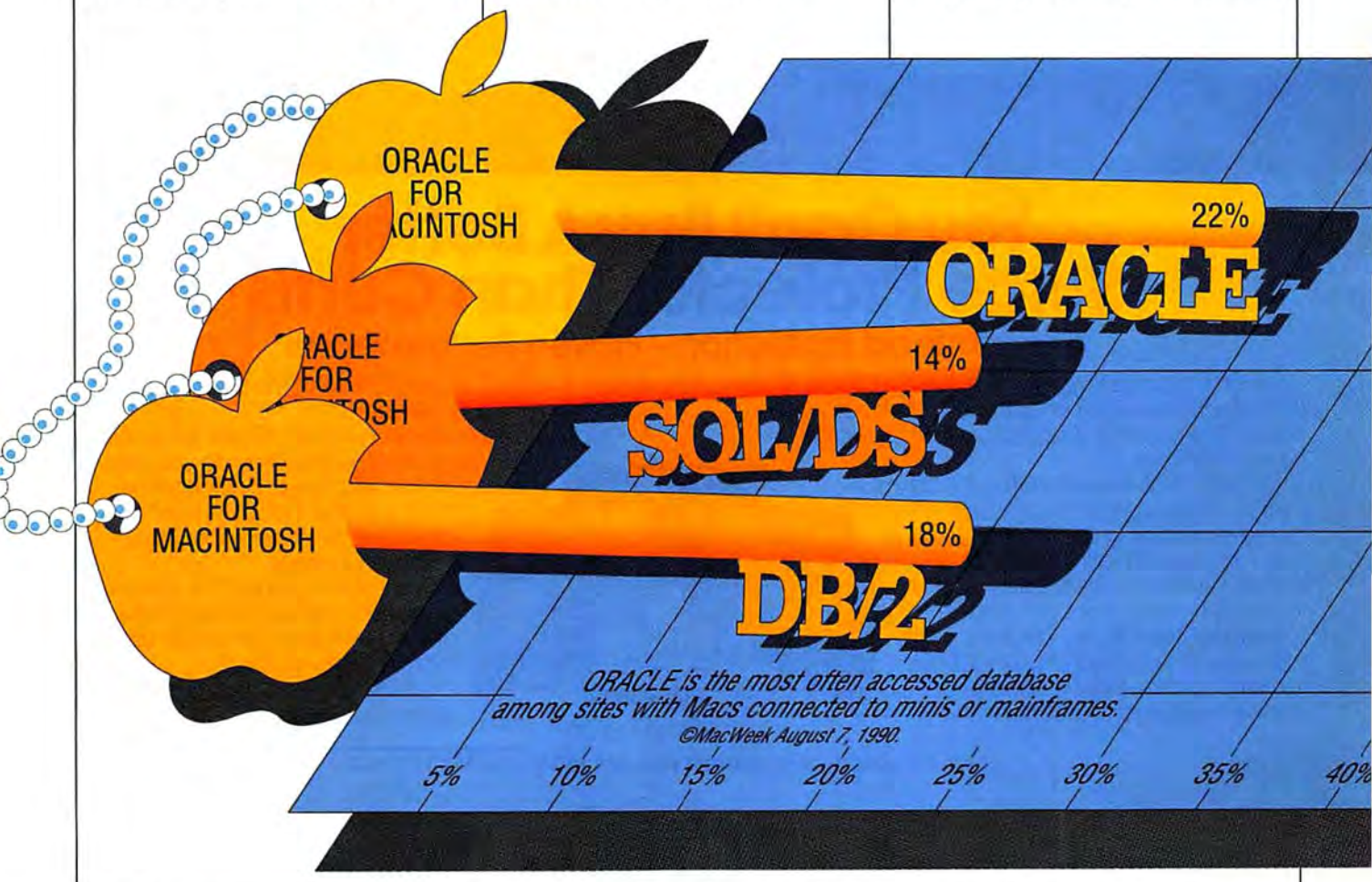
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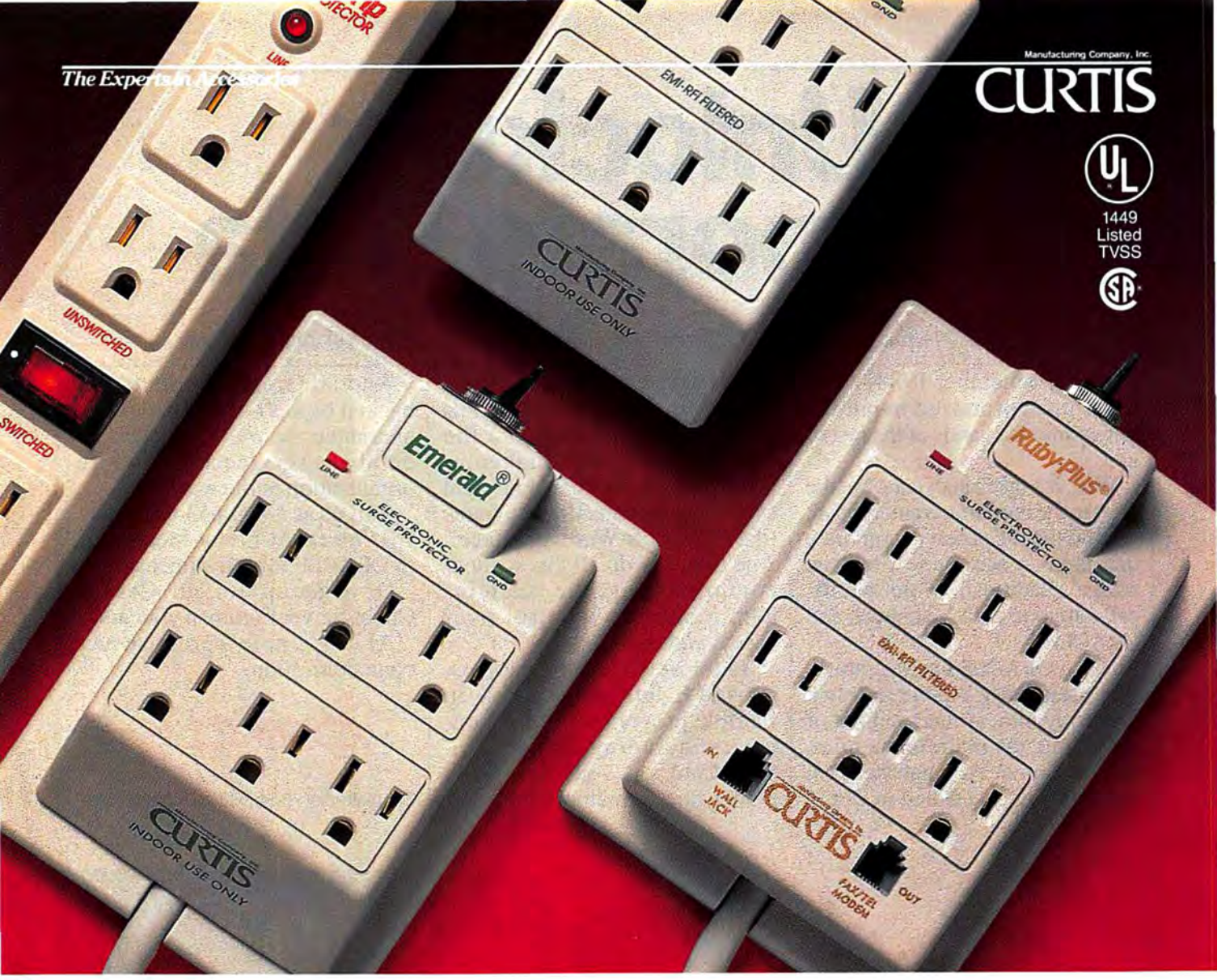
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LETTERS



John Eckert of Philadelphia, Pennsylvania, was inspired to relay his experience with one of the printers we recently reviewed. After being amazed at the quick and efficient repair service provided by Kodak for his XL7700 printer (see review, January '91, page 62), he was able to ship a rush job on time. But his relief was short-lived. The revived printer "broke out of the box at the airport and dropped to the concrete. It was badly dented and had Styrofoam peanuts throughout its inner workings." Undaunted, Eckert cleaned it out, bent the housing back into position, hooked it up, and it worked! After several months, it's still ticking with no reported problems.

✉ *Write to Letters to the Editor, c/o* MacUser, *950 Tower Lane, 18th Floor, Foster City, CA 94404, or post your letter on the MacUser Forum of Zmac, our on-line service.*

All letters become the property of MacUser, *and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.*

Eyeing the LC

I became interested in buying a Mac LC after reading your article "Three Cheers for Three New Macs" (December '90, page 90), but I wasn't so impressed with the LC's color monitor. Does the LC work with other color monitors? If so, are other parts needed to use it?

Victor Gorodinsky
Champagne, IL

Some people don't like the fact that the LC's color monitor has only 512-x-384-pixel resolution. Fortunately the LC works with any 640-x-480-pixel monitor that's IIci-compatible, such as the standard Apple 13-inch color monitor. It also works with monitors for the Mac from Magnavox, Mitsubishi, NEC, Seiko, and Sony. You need IIci compatibility because both the LC and the IIci have built-in display circuitry that automatically determines what monitor you're using by interpreting the pin configuration of the monitor cable. If pin 4 is grounded to the plug shell, for example, the LC knows you're using a 640-x-480-pixel color monitor. Most vendors now supply such a cable, but be sure to ask.

You may also want to add video memory. The LC's 256K video-RAM SIMM supports only 4-bit color on a 640-x-480-pixel monitor (although you get 8-bit color on the 512-x-384-pixel display). However, you can swap in a 512K video-RAM SIMM, but you must discard the 256K SIMM. This costs around $250 and delivers full 8-bit color with a 640-x-480-pixel monitor — or 16-bit color on the 512-x-384-pixel monitor. That's why I just bought an LC with a 512-x-384-pixel monitor.

One last point — the curved front of the LC makes a poor fit stylistically with some monitors, such as the Apple 640-x-480-pixel color display. See how it looks before you buy. — LT

Loose Chips Sink Ships

The lack of good network-management tools is increasingly felt as AppleTalk networks and internets grow up. As pointed out by Kurt VanderSluis ("The Right Tool," November '90, page 229), it is very hard to optimally configure a network without such tools, and his Packet Cruncher stack should be helpful to many network managers.

I think that this situation gives rise to a crucial security problem, however. Good management tools, such as Cayman's famous Watch program, let anybody with a Mac on an AppleTalk or Ethernet network trap packets and analyze their contents. These packets can be TCP/IP, Telnet, SMTP, and so on.

Even a relatively inexperienced network

Dear Mr. Sculley . . .

In January we mentioned that John Sculley's New Year's resolution was to regain eroding market share. We asked readers for **the one best reason to switch to a Mac.** The responses tended to focus on ease of use, as you might expect — but with some wrinkles.

Here's an example: Wilhelm S. Aanestad of Riverside, California, works for an employer that insists that he use an IBM PS/2 at the office. His employer even provides him with an IBM PC/AT to use at home. So he bought a Macintosh with his own money: "The stark reality is, I take all of my computer work home to do on my Macintosh. The Macintosh gives me superior results faster, easier, and more enjoyably than the PC at work."

Marc Blaydoe of Waldorf, Maryland, thinks it is the GUI. "A GUI is much easier to use and learn. Learning quicker means you're more productive on the job."

College student Sean M. Joyce of Tiffin, Ohio, proposes a Mac advantage that would have been unthinkable just a short while ago: "Affordability. My IIcx only cost the equivalent of one-and-a-half semesters of coursework." We sure hope he attends a public school. Sean has an even better reason, though: "It gives me a legitimate excuse to subscribe to *MacUser*."

Ben Hallert of Eugene, Oregon, thinks that the "interesting company politics at Apple" make it all worthwhile. "All the other companies are boring, slow, and unoriginal."

Wally Parker, also from Eugene, Oregon, which must be an evangelical hotbed, sent us a more Pavlovian reason. The Mac stimulates our "pleasure centers" and he figures, "A computer that's more pleasurable to work with is demonstrably used more often, more intently, and to better effect. The people who work with it are happier, more confident, and more eager."

PC users have some 500 laptop models to choose from. Mac users have 3. Some would argue that all that would change if Apple would license its ROMs, which contain the system code that make the Mac a unique computer. Apple could still tightly control who got the ROMs and for what purpose. After all, potential clone makers have been beaten to the market by Apple itself. And maybe we'd get a taste of the incredible variety PC users enjoy.

Speak Up:
Should Apple license its operating system?

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user can peek at your user-name/password pairs for your favorite AppleShare server or, for a UNIX host, whenever you connect. Further, other users can trap packets that are sent to a LaserWriter and retrieve whole PostScript files on the sly.

Such practices cannot be prevented with this kind of network (any workstation can grab packets and look at their contents). Encrypting user-name/password pairs could make things harder for pirates.

Users should be aware of this possibility because the worst situation is when only hackers know that they can do such things. When you understand that anyone can access your information when your Mac is on the network, you realize that floppy disks are a more secure way to send confidential information.

Jean Thioulouse
Cedex, France

Getting Satisfaxion

I've wanted to buy a modem for the past few months but was unable to decipher the different brands, features, and prices. "Thoroughly Modern Modems" in the January issue (page 100) saved me weeks of indecision. Steven Satchell and the Labs staff did an excellent job of clarifying the different protocols and standards.

But I still have a question that wasn't addressed in the article. I'm interested in modems with fax capabilities. Is there software to make modems operate as a fax? If not, do I need to buy one with fax capability built in to the hardware?

John Zimmerman
Somerville, MA

A few modems use recently developed chips with limited 4,800-bps fax support along with firmware to support fax operations. However, to actually send faxes with such a modem, you also need software such as BackFAX from Solutions (Williston, Vermont; [802] 865-9220). BackFAX comes in different versions for various modems. Some vendors also offer their own fax-software upgrades.

Even without a fax modem, you can still send faxes via on-line services such as CompuServe or MCI Mail. You create text mail and then specify a fax telephone number. A forthcoming feature is fax receive — an on-line service takes a fax, runs it through OCR software, and forwards the text to you at your mailbox.

If you plan to send many faxes, get a modem that handles data at 2,400 bps or more and faxes at 9,600 bps. One such modem, the Prometheus 9696 (Prometheus Products, Tigard, Oregon; [503] 624-0571), offers 9,600-bps fax with 9,600-bps, v.32 data capability. — SS

Get Smart Shareware

I'd like to assure John Brosnan ("Letters," December '90, page 18) that there are many good educational shareware programs. You have already mentioned Gravitation Ltd., an excellent program. Others include Scientist's Helper, Graphtoolz, and Venn. Any good user group should have these — and more — in its library. Mr. Brosnan should contact his local user group or contact us at (215) 895-2573 (voice) or (215) 895-2579 (our BBS). You can download several of these programs from our file-transfer section.

Scott Brown
President, DUsers
Drexel University's Macintosh Users' Group
Philadelphia, PA

All Those in Favor

MacUser always seems to cover everything I'm interested in, but in particular Guy Kawasaki's column and the Help Folder with Bob and Andy give me more belly laughs (and good info too) than just about anything other than "The Far Side." You make computing *entertaining*, and isn't that what makes anything fun to learn?

I make most of my hardware and software choices based on your reviews, and I haven't been disappointed. On the contrary, you've saved me a lot of hassles.

Sky Canyon
Aspen, CO

Apple, Schmapple!

I fail to understand why some of your editorial staff (particularly Guy Kawasaki) are so obsessed with the inner workings of Apple Computer.

Does it ever occur to you that the Mac is simply a unique piece of office equipment and that relatively few of "the rest of us" give a hoot about Apple's board of directors, third-quarter sales, and overseas-marketing strategy?

I probably love my favorite breakfast cereal as much as I love my Mac, but I've never felt compelled to write to the CEO of General Mills, nor do I stay up nights worrying about its corporate policies.

Who cares?
Marcy Poulos
Sparta, MI

Part of the Macintosh phenomenon is the separation of computer and company:

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LETTERS

"I love my Mac. I hate Apple." I try to help people understand how Apple works and try to force Apple to change its ways.

When our attitude becomes "I love my Mac. I love Apple," more Macs will be sold, people will be happier with them, and the world will be a better place.

Apple and Macintosh are inseparable. I care. Many readers care. Can a person love something and not care about the people and company who made it? —GK

Right for Once

It's a rare day that I agree with John C. Dvorak, but I have to concur with his statement that software piracy is a sales tool ("The Gloom and Doom Boom," January '91, page 346). Because I have far-from-unlimited resources, it's nice to be able to kick the tires and go for a test drive. This practice has saved me money and saved some software companies my animosity. It's like expensive shareware — buy it if you like it; trash it if you don't.

Paul G. Gifford
State College, PA

The TI-tanic

John C. Dvorak's "The Gloom and Doom Boom," (January '91, page 346) pointed out some of the well-known losers in the desktop-computer market. As a Texas Instruments alumnus, I felt insulted that none of TI's failures were mentioned, especially because TI had so many: the Home Computer, the TI PC, the 990 mini, and the Explorer Lisp Machine. In its defense, though, Texas Instruments has recently started to accept the Mac into its culture in the guise of the MicroExplorer.

Mark Johnson
Dallas, TX

MacWait

One way for Apple to regain its eroding market share is to take a long, hard look at its dealer structure.

For me, contending with dealers has been nothing but trouble. I have been trying to purchase a Mac IIsi since the day it was announced, using my wife's employee-purchase plan. Businessland is the vendor. It received our order in early November.

Now, a month later, despite constant contact with Businessland, we haven't received the IIsi — just a litany of excuses.

I think I'll never buy another Macintosh. If one of the largest Mac dealers can't deliver 1 machine, how can I expect it to deliver 50 of them to my department at work in a timely manner?

Perhaps I can expect better responsiveness from IBM. My company *was* considering purchasing new Macs to replace its aging PC/ATs — no longer. If Apple's retail outlets can't deal with customers in a timely and forthright manner, I'll find another company that can. Unfortunately, that company is IBM, because purchases move directly through its corporate channels.

Charles Boyer
Cary, NC

You seem to be basing your judgment on a single situation in which you were trying to get a brand-new Macintosh model that was in short supply. Apple grossly underestimated the demand for its new machines and has been frantically ramping up. Furthermore, you were unable to shop vendors, because your wife's company specified a single source.

None of these factors necessarily apply to a group purchase by your company. Dealers are more motivated to give good service when they know you have other purchasing options. Also, IIsi's should be plentiful by the time you read this. Moreover, although IBM has a reputation for good service to large corporate customers, that doesn't make up for the grief you'll go through trying to get your employees up and running on their PCs. I'm a veteran user in both environments, and I've seen what happens after the friendly IBM salesman goes home —LT

End of an Error

About a year ago, our office converted to a network of seven Macs, a Jasmine DirectServe, and a Jasmine 130-megabyte hard-disk drive. A consultant recommended this setup instead of dedicating an SE/30 as a server. At the same time, we converted our DOS database to Blyth Software's Omnis 3 and a fund-raising package written by Campaign Associates.

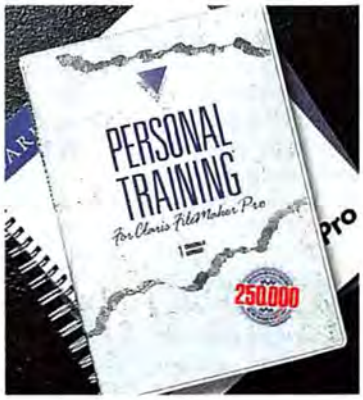
We loaded our database onto the Jasmine, but after a month, Omnis 3 started generating error messages. These messages said that data pointers had been damaged. We then found that all the database's data pointers were corrupted.

Blyth Software, Campaign Associates, and Jasmine looked at the database and concurred that the problem was the DirectServe's inability to handle Omnis and other multifile databases that link files with data pointers.

Jasmine promised a fix and extended our warranty to cover the time needed to

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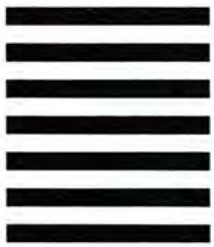
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create and test the fix. So we held on to the DirectServe, but several months later, instead of providing a fix, Jasmine filed for Chapter 11.

The "new" Jasmine sent us a fix last October. We tried it, and Omnis 5 generated the same error messages. Jasmine won't honor the warranty extension, which was the reason we kept the DirectServe. Anyone thinking of buying a Jasmine DirectServe should know that its software is incompatible with Omnis 3 and perhaps with other multifile database programs. We learned a hard lesson and hope others can avoid the same problems.

Charles Gordy
Wiscasset, ME

Gregory M. Lynn, director of hardware engineering at Jasmine, responds: "Ongoing compatibility and development testing is a priority for Jasmine, and any problems discovered with any Jasmine product, including the DirectServe, will be addressed and remedied.

"Jasmine's procedure when it finds a compatibility problem is to contact the hardware or software company in question, to offer a loaner product, and to work with its engineering department to solve the problem. This procedure is being followed for the Omnis 3/5 incompatibility problem."

The First One's Free

Please include a section in future surveys concerning additional program costs. I believe that purchasers of the atOnce! accounting program have been misled about the program's low cost. The catalog warehouse price is approximately $250, but the annual payroll update costs $100.

I purchased atOnce! in November '89 (the first payroll module for '89 was free), but I had to purchase the '90 payroll update and now the one for '91, which totals $200 within 13 months. The five-year price is $750! Other "low-cost" accounting programs either let users update features or charge a reasonable $25 for their updates.

This is not a problem as long as

1. The software's packaging is clearly marked with the extra costs.

2. The documentation is clear. (Nowhere does atOnce! say that the failure to pay $100 per year renders the integrated-payroll software useless.)

3. Its advertising states the extra cost.

4. *MacUser* surveys reflect the extra cost.

Dale S. Zabel
Culver City, CA

You've got a point, but there are some mitigating factors. Payroll programs must be updated annually, for the same reason as tax programs must be — state and federal governments change the ground rules every year.

It takes a lot of work to do 51 separate updates every year, and it's fair to charge for that work. When you evaluate the relative cost of payroll-module updates, be sure to consider the relative depths of the modules, and factor in how much manual labor each module requires before you compare total prices. You should also look at how tightly each module integrates with the rest of the accounting package. — LT

Silent Running

You overlooked one nifty feature of WordMaker in your January '91 review ("Best-Buy Bargain Word Processors," page 156): It can process in the background under MultiFinder. This feature lets you start a mammoth search-and-replace project, for example, and then begin working in another application while WordMaker continues the search/replace in the background. Microsoft Word lets you switch out during a search/replace, but it suspends activity until you return. WriteNow doesn't even let you switch out.

Scott Harris
Mt. Kisco, NY

SlowScript

In your November '90 article "Affordable, Laser-Quality QuickDraw Printers" (page 134), the printers were described as not being PostScript-compatible. As you are likely aware, a utility named Freedom of Press lets you print PostScript files on certain QuickDraw printers.

I find this software tediously slow, but for users with more time than money, it's a viable alternative to buying a PostScript printer.

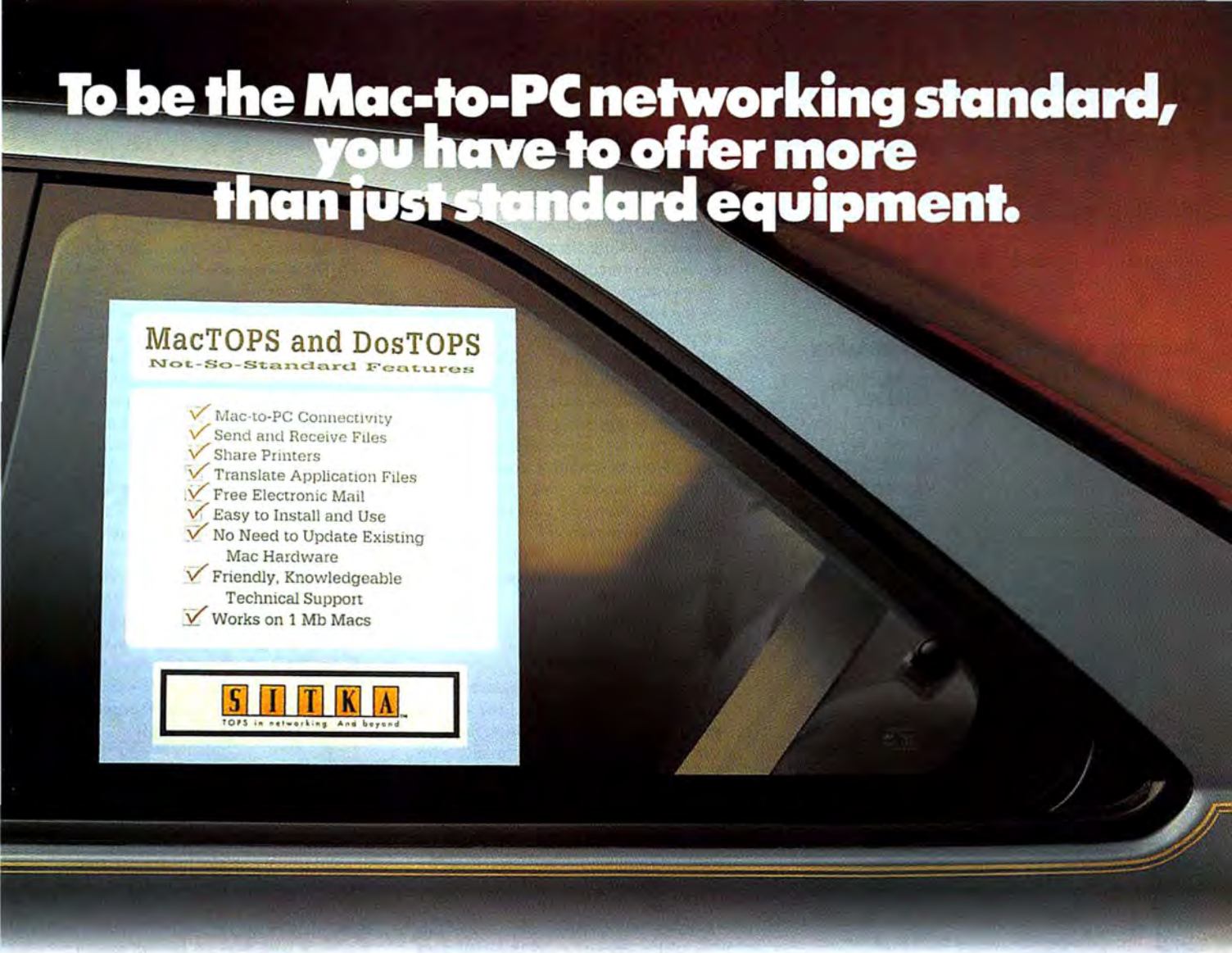
Don Peckhan
Berea, KY

Reviews of the latest versions of both Freedom of Press and Freedom of Press Light appeared in our February '91 issue (page 93) — LT

Doubel Fault

I have yet to read a review of WriteNow — including your January '91 review of low-cost word processors ("Best-Buy Bargain Word Processors," page 156) — that exposes a major problem with its

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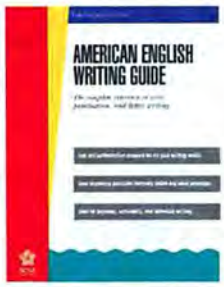
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LETTERS

spelling checker: WriteNow can't suggest the correct spelling of a word that has more than one incorrect letter.

For example, WriteNow fails to suggest the correct spelling for these words: *upgraid, consice, necesery, impracticle, intermitant,* and *ripetative.* On the other hand, MacWrite II suggests the correct spelling for all six words, and Word 4.0 gives correct suggestions for four of them.

WriteNow is even stumped by *telefone.* Poor spellers, beware! If you need a spelling checker that can consistently suggest the correct spelling for your fractured orthography, then WriteNow, despite its otherwise excellent capabilities, might not be the word processor for you.

John E. Price
Palo Alto, CA

Simple Pleasures

Your comparison of low-end word processors (January '91, page 156) left out one crucial issue: the frustration factor.

As a Mac consultant and journalist who specializes in word processing, I've tried all the packages you reviewed, as well as MindWrite, MacWrite, and the unlamented Word Juggler. Factoring in the frustration factor, I recommend WordMaker to all my clients who don't need multiple columns or footnotes.

I have never been able to crash WordMaker, even when I deliberately tried to exceed its capabilities. In contrast, I've lost hours of work when MacWrite II or MindWrite hung while doing something as simple as opening a file or saving it under another name. I've found cuts and pastes in those programs to be especially risky.

I've never switched computers or printers with a WordMaker document and found that my page formatting has shifted, which sometimes happens with Word. Worse, when I've changed printers in WriteNow before printing, the program has informed me afterward that perhaps my document had lost some text along the left edge. Users who don't own laser printers and pay for output will not appreciate this "feature." It's users of WriteNow and its low-end ilk who are least likely to have their own laser printer.

WordMaker might be the Volkswagen Beetle of word processors. Although its feature set is limited, it's never made me tear out my hair.

Shel Horowitz
Northampton, MA

We recommended WordMaker "as an excellent choice . . ." and suggested that "if all you want is a little speed and simplicity, WordMaker should suit you just fine." As far as not being able to crash WordMaker, even when you're admittedly trying to exceed its capabilities: That's exactly our point — its capabilities are limited. Although you may have lost hours of work because of MacWrite crashes on your particular system, how much time are you willing to lose trying to work around a program's limitations? Still, we recommend WordMaker as a fast, efficient word processor—if you don't need the features it lacks, such as multiple columns and footnoting.

About system crashes: We run clean systems during tests, without the INITs and DAs that frequently cause conflicts with applications. There were no system crashes when we performed the Save tests with any of the programs we reviewed, including MacWrite. You might want to check your System Folder. — KW

Free Drawing

I'd like to know if we slackers who didn't buy the September '90 issue can still get a copy of the "MacUser Guide to Graphics Formats" poster for a reasonable (or even exorbitant) sum of money.

Amy V. Ziffer
Burbank, CA

You're in luck, because we still have a few extras. To get one, send a self-addressed, stamped 8.5-x-11 envelope to Nancy Peterson/Graphics Poster, MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Or, for a slightly exorbitant price ($7), you can get a copy of the issue, complete with poster, from our Back Issues Department. Call Angela Accetta at (212) 525-5008. — NP

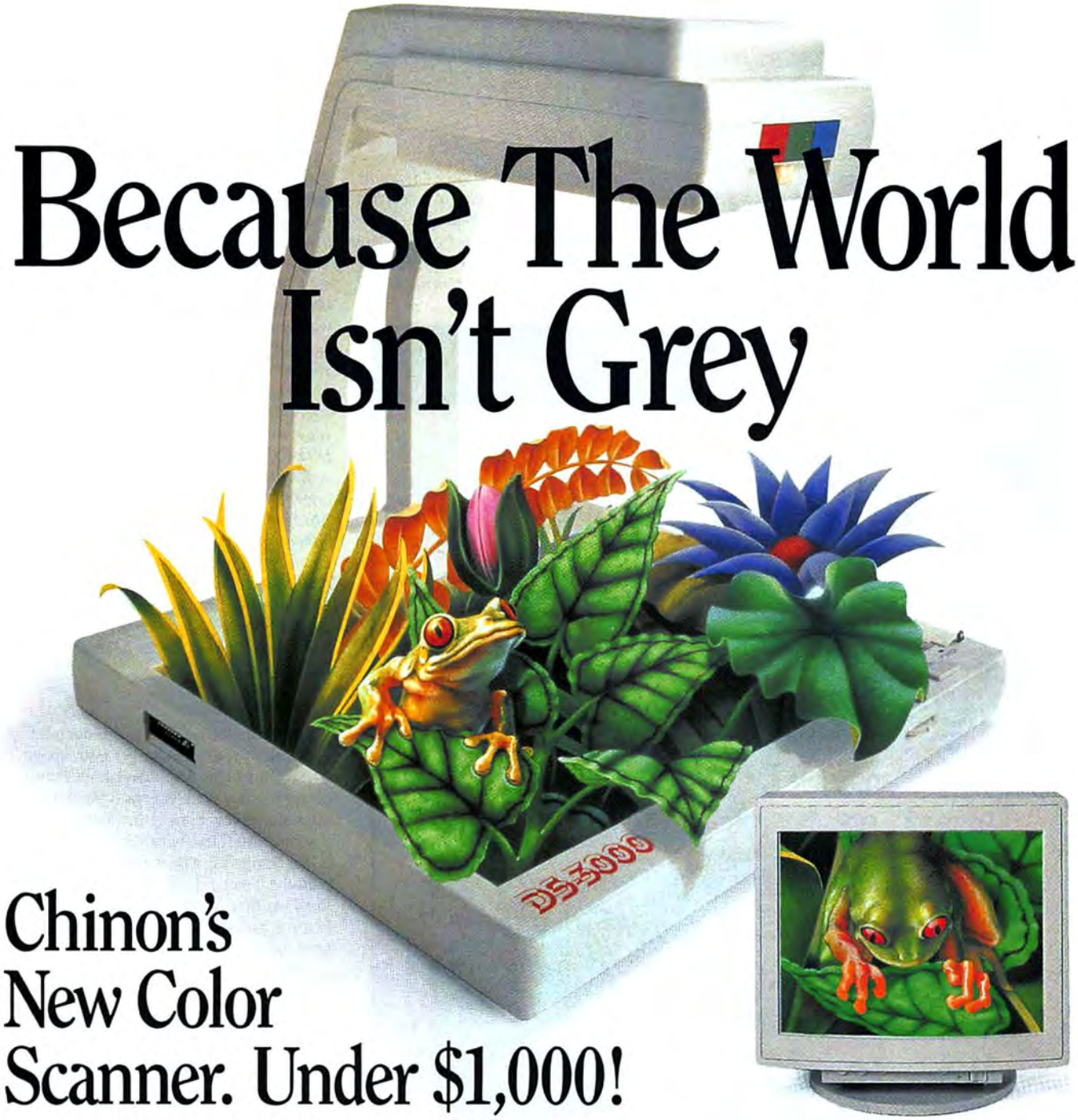
Fragged

For at least two years you've recommended the program DiskExpress II. On the basis of that recommendation, I bought the program about a year ago.

I've used DiskExpress II on a Mac SE and a IIcx. I've never seen any improvement in the performance of either machine because of defragmenting or optimization. At best, the program is good at exercising the disk drive, moving hundreds of files around each time it runs.

At worst, after following the instructions exactly, I found that it destroyed my SE's hard-disk-drive contents. It bombed while doing automatic optimization in the background, and no other program was

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running in the foreground.

Any product that can destroy a Mac's hard-disk drive does not deserve the high rating you give this one.

Dr. Michael J. Wengler
Rochester, NY

As our July '90 review (page 48) points out, DiskExpress II probably overreaches itself in offering — and touting — background optimization. It works fine if you forgo that feature, however. Considering that, I wouldn't dream of optimizing a disk until I noticed significant performance degradation, regardless of whether the optimizer program said my disk was highly fragmented.

You probably didn't notice improvement after optimization because you did it before you needed it. Also, your hard disk wasn't destroyed — just the files magnetically imprinted on the platter. Although you weren't running an application in the foreground, the crash you describe could have stemmed from bug-ridden System software or an INIT rather than from Disk Express II.

Using an optimizer is an alternative to reformatting your hard disk from scratch. Always back up your files before doing either process so that if an optimizer does crash, you haven't lost much more time than you'd have had to invest anyway. Optimizers do a major overhaul of your hard disk's files. Car engines need overhauls too. Neither should be undertaken lightly. — LT



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Dis-integration

In response to your review of our product Desk in your January '91 issue (page 74): Although the details and descriptions of our product were generally accurate, I think the review missed the point.

Comparing Desk with Microsoft Works is like comparing a fleet of seven PT-109s with the Titanic. Desk consists of small, fast DAs that are integrated with *all* your favorite programs — *not* just with itself (and they easily avoid icebergs).

Michael A. Gariepy, CEO
Zedcor
Tucson, AZ

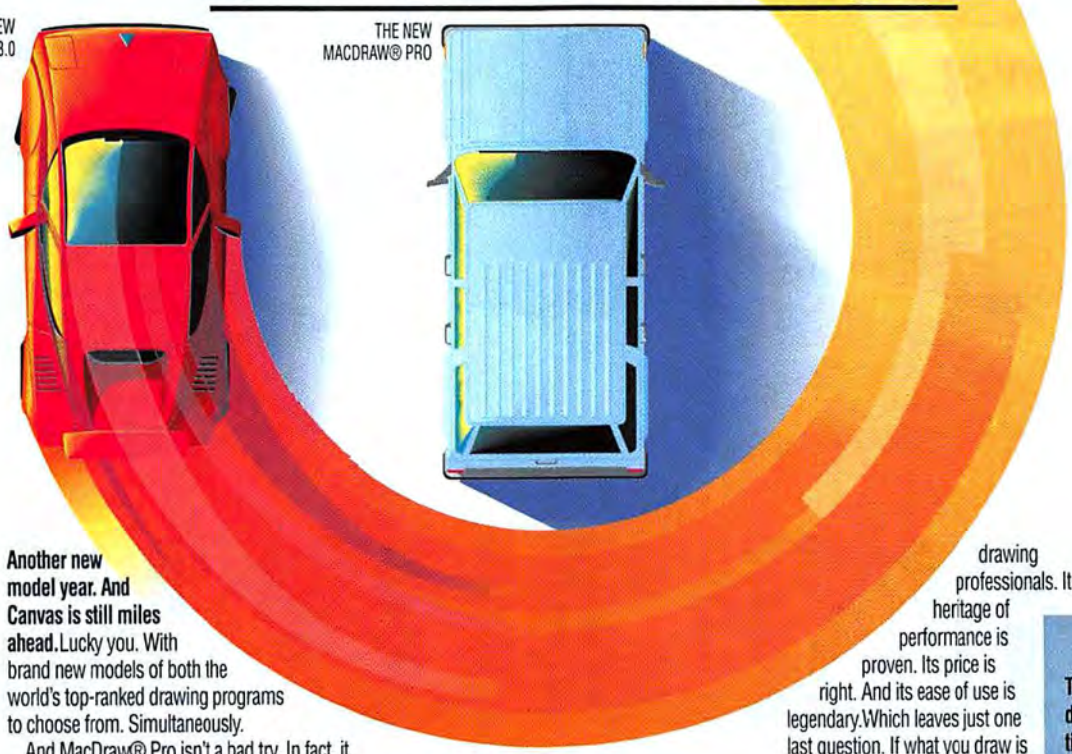
Consistency should apply to language as much as to computer interfaces. A package of "integrated" software should be exactly that. Desk is clearly labeled as an integrated package, but it isn't integrated at all. Perhaps what we're looking for is another modifier that means a collection of packages, without suggesting integration. "Bundled," perhaps? — RI

Backdoor Mac

I am fighting the battle in a Mac-illiterate town but am eroding my manager's obstinacy. My advice: Don't demand a Mac initially. Use the PC for a while, and then complain about its inefficiency, user unfriendliness, poor graphics abilities, and so on. Plant the seed that the Mac is the only solution.

Dale Rogers
Sherman, TX

SORRY, CLARIS. BUT IT'S DEJA VU ALL OVER AGAIN.



Another new model year. And Canvas is still miles ahead. Lucky you. With brand new models of both the world's top-ranked drawing programs to choose from. Simultaneously.

And MacDraw® Pro isn't a bad try. In fact, it reminds us of another drawing program we've always had the utmost respect for : Canvas 2.1.

Unfortunately for Claris, our new Canvas 3.0 includes enough major enhancements to leave their latest effort idling somewhere back in the dust. Again.

Let's take a look under the hoods. Canvas 3.0 gives you more high-end text handling features. Like binding to curves. Slanted margins. Text-wrapping outside — and/or inside — irregular objects, and full kerning & tracking control. Even conversion of PostScript® Type 1 fonts to customizable Bézier outlines.

MacDraw Pro doesn't.

Canvas 3.0 gives you more technical drawing features. Like custom dynamic hatching. Custom parallel lines & curves. Custom dashed lines, curves & borders. Automatic dimension lines. Area & perimeter calculations. And a Smart Mouse™ drawing aide.

MacDraw Pro doesn't.

Canvas 3.0 gives you more design/illustration features. Including unparalleled Bézier curve editing power--from multi-point selection & editing to automatic object conversion, combining and blending. Magnetic guidelines. Center line auto tracing of scanned images. And full bitmap editing in 24-bit color.

MacDraw Pro doesn't.

Canvas 3.0 also gives you new built-in translators for important multi-platform formats like CGM, IGES and DXF™. And Open Architecture technology — allowing new tools, effects and translators to be added with ease at any time.

MacDraw Pro doesn't.

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Note to Canvas Users: Registered users who purchase Canvas 2.1 between Jan 1, 1991 and May 31, 1991 qualify for a free upgrade to Canvas 3.0. All Canvas 2.1 users who purchased prior to Jan 1, 1991 can upgrade to the new version for only $99 US. Canvas 1.0 or 2.0 users may upgrade for only $129 US. Prices valid through Aug 1, 1991. Allow 4-6 weeks for delivery. All orders add $10 shipping & handling.

International Users: Please contact your local authorized distributor for availability details.

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JON ZILBER

In Technology We Trust



The Mac's 'power to be your best' has a dark side: the power to cloud your mind — and to invade your privacy.

Use a Macintosh long enough, and it starts to mess with your mind. First your psyche gets a bit wobbly, and before you know it, you're playing with a whole new set of rules.

Let's start with your psyche.

It starts out subtly, but the symptoms are unmistakable. Like remote-control freaks who have to stifle the reflex to brandish an imaginary TV "channel zapper" to click their way out of a boring conversation by switching reality channels, you forget which is reality and which is your Macintosh desktop.

You start expecting the Mac's metaphors to apply to all aspects of your life. For example, when you need to be sure you'll remember some important new information, you don't simply jot it down on a memo pad. Instead, your hand instinctively moves to pull down the File menu and execute a Save command.

As the disorder progresses, the symptoms become more severe. Your fingers navigate an imaginary mouse pad to pull down the Find File DA whenever a tidbit of information is on the tip of your tongue — but you've forgotten where your tongue is.

Your new reality is fully able to support you in the style to which you've grown accustomed. If you're stuck in a rut, you move to open a new document. When you need to remind yourself of the big picture, you reach for the grow-window box.

If this kind of thing hasn't started happening to you, be patient — it will. One of the hallmarks of the human brain is its remarkable capacity for training itself to believe things it knows to be false. Back in high school, we all memorized the laws of physics, the gospel according to Newton and Einstein. But back in grade school, we also memorized the laws of cartoon physics, the gospel according to Bugs Bunny and Road Runner. Such as: Whenever Wile E. Coyote runs off the edge of a cliff, he doesn't fall — not until he looks down and realizes he's been hovering in midair. Cartoon physics also show up on the big screen more and more these days: In the movie *Ghost*, Patrick Swayze's character swooshes through subways, walls, and doors but is stopped dead in his tracks (so to speak) by floors.

And although most of us usually accept that the physical world works according to Isaac's and Albert's rules, we can — when it's convenient — shift gears and adopt Bugs' and Wile E.'s calculus-free way of thinking. (After all, most of us spent far more time with the Looney Tune crowd in our formative years.)

In fact, we often find it easier to favor the preposterous over the unlikely. Two characters in Douglas Adams' novel *The Long Dark Tea-Time of the Soul* argue the point this way:

"'What was the Sherlock Holmes principle?' "Once you have discounted the impossible, then whatever remains, however improbable, must be the truth.'"

'I reject that entirely,' said Dirk sharply. 'The impossible often has a kind of integrity to it which the merely improbable lacks. How often have you been presented with an apparently rational explanation of something that works in all respects other than one, which is just that it is hopelessly improbable?'"

Technology Rules

Changing the rules is a lot easier than facing up to a set of complex facts. Technology has the awesome power to change all the rules without blinking. So does the human mind. In his book *From Beirut to Jerusalem*, journalist Thomas L. Friedman gives this example: "The Austrian-born philosopher Ludwig Wittgenstein once remarked that if you ask a man how much is 2 plus 2 and he tells you 5, that is a mistake. But if you ask a man how much is 2 plus 2 and he tells you 97, that is no longer a mistake. The man you are talking with is operating with a wholly different logic from your own."

Once you get past the minor fact that the basic assumptions are wrong, contradictory, or impossible, it's easy to admire and even believe the consequent logic of cartoon physics — or of technological empowerment. Technology has the power to change the floor plan. The humans at the helm of the machines have an uncanny knack for accepting any new set of ground rules. The combination has tremendous potential for progress — or catastrophe.

Start trusting technology — especially something as reliable and consistent as the Mac — and you end up being frustrated when the world doesn't work with a consistent interface.

With the slogan "The Power to Be Your Best" emblazoned on its family crest, the Macintosh has thrived. But the part that Apple left out is that power corrupts — especially when you're counting on it the most. There's something about hard disks that makes them refuse to crash until you have a very important presentation to give in 15 minutes.

Technology is never the total solution to anything — whether it's business problems, international conflicts, or going about your

daily business. It's fallible, it's vulnerable, and it's a piecemeal solution.

Technologies have consequences. Some affect work-group productivity; others affect geopolitics. And others affect your junk mail.

Balk Mail

Usually the march of technology is an unstoppable force. But when consumers take a stand, the juggernaut can be arrested. Which is exactly what happened with MarketPlace versus the marketplace.

One day last January, Lotus Development found itself in the midst of a consumer uproar about a planned Macintosh CD-ROM product called Lotus MarketPlace: Households. The disc was to include demographic data about 120 million U.S. consumers, a follow-up to a previous release containing data on 7 million U.S. businesses.

The names and addresses on the CD-ROM discs were intended for consumer and business-to-business bulk mailers. Most of this data is already a matter of public record; the names and addresses of most businesses and individuals are freely available in the phone book. Still, many advocates of consumer privacy pointed to the potential nuisances or even the dangers that could result once this information became more accessible and more targetable.

The data was provided by Equifax, a billion-dollar company in the business of collecting and selling this kind of information. All the data was already widely available to marketing professionals. The only new element was the way the information was to be distributed: on CD-ROM discs.

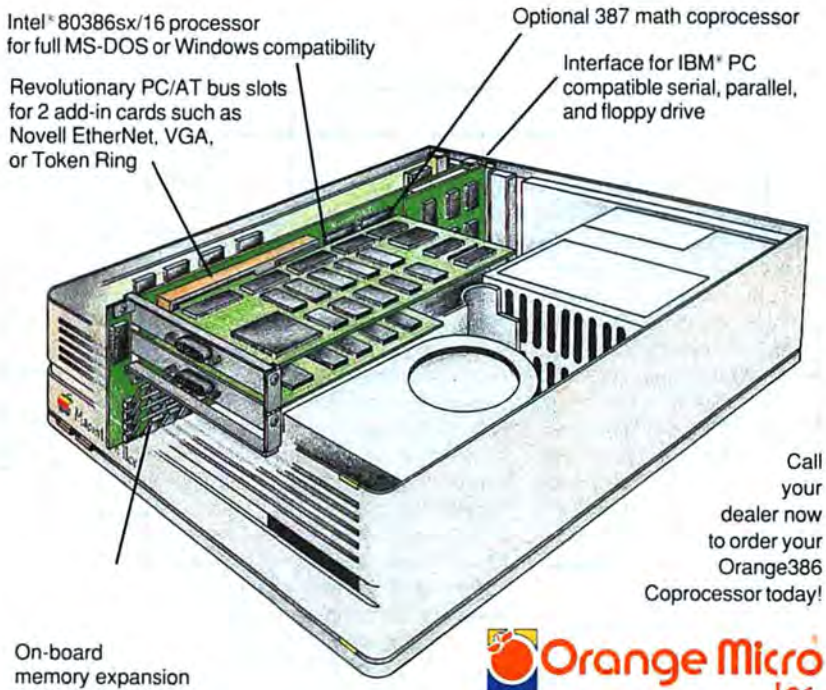
Anticipating that the disc might cause a stir, Lotus had built numerous consumer-privacy safeguards into the disc itself (telephone numbers, income data, credit history, and other particularly sensitive items in the Equifax database were excluded) as well as into the way the disc would be distributed (a controlled purchase process was aimed at restricting the disc's sale to bona fide businesses). Lotus and Equifax also provided consumers with a no-cost way to remove their names from the database (although this, of course, was an option only for the small percentage of consumers who knew of the disc's existence and could take effect only for update discs).

The MarketPlace product was a real breakthrough for marketing professionals. It provided them with far greater control and economy than the traditional channels for buying and renting lists of names for mass mailings and market research. Technologically, MarketPlace was a useful and innovative piece of work, with the Business disc having garnered a *MacUser* Eddy Award nomination. But the concept of concentrating millions of files of private information into a compact, easily accessible form had a dark side. Data about 7 million businesses scared many consumers; data about 120

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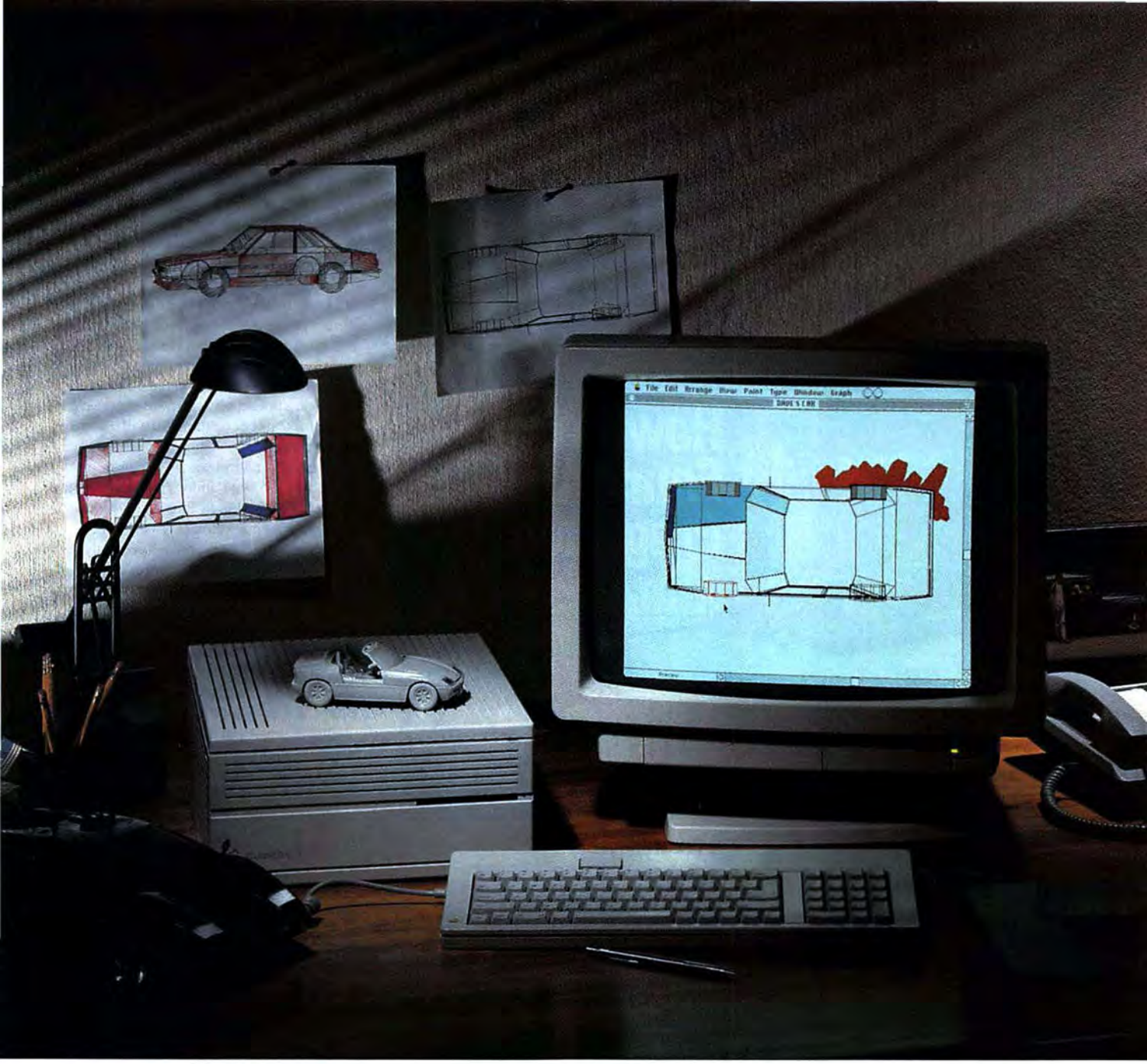


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DiskLock doesn't let anyone into your system without your password. It automatically locks your drive when you shut down, and you can set it to lock when your Mac's been idle for a specified time. Plus, DiskLock lets you choose from three levels of security, including the government standard, DES encryption. That's serious protection.

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million individuals outraged even more. As *MacUser*'s Robert Wiggins commented last September, "As with Pandora's box, once the information escapes, there's no way to ever contain it again."

Faced with mounting complaints from consumers — a reported 30,000 irate individuals asked to have their names removed from the database — Lotus canceled the Households disc and also discontinued shipment of the Business disc. Lotus CEO Jim Manzi predicted that "Balancing the advantages of easier access to information with the individual's right to privacy is only the first of many new issues our industry will grapple with in the coming years."

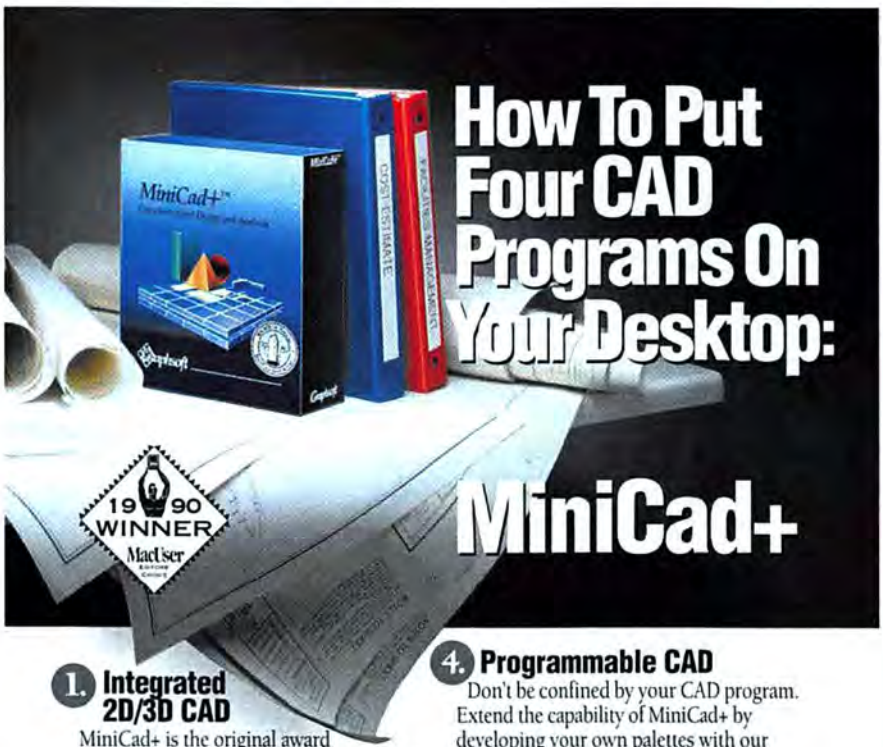
Lotus made the right business decision. By taking a loss on its development-and-marketing investment in MarketPlace — as well as forgoing anticipated profits from the disc — it has managed to keep the lid on a potentially far more expensive Pandora's box of consumer ill will toward the company.

Like information, once a technology gets out of its own Pandora's box, there's no stopping it. Discs like MarketPlace *will* reach the marketplace — eventually. In the meantime, consumers have bought time and entered into the process of setting the agenda and deciding how best to control what comes out of the box. MarketPlace is neither the first nor the last technological marvel to be squelched by an angry public. There is an endless stream of emerging technologies — such as ISDN, artificial intelligence, and virtual reality — with their own hidden prices of power lurking within. The only sure safeguard is an alert and vigilant public that knows which trade-offs it's ready and willing to embrace.

Selling Your Wares

Discware such as MarketPlace is also redefining (or, at least, attempting to redefine) the formats, media, and procedures of software distribution. Like the now-defunct MarketPlace discs, many font and clip-art CD-ROM discs contain more items than most customers can afford to buy in one shot. Several vendors have incorporated access-code schemes whereby, for example, customers might have access to 20 of 100 fonts encrypted on a disc as part of the purchase price. To get more fonts, customers call the vendor, provide a credit-card number for payment, and immediately receive the password for getting access to another 20 fonts. The customers get the convenience of instant delivery while the vendor gets a happy (and captive) customer and cuts down on distribution costs as well.

With these kinds of new software coming into vogue, we'll need some new terminology. You probably know what shareware and freeware are — but that's just the beginning. Here's an excerpt from a new dictionary of computer-industry terms due to be published this month — on April 1, in fact:



1. Integrated 2D/3D CAD

MiniCad+ is the original award winning 2D/3D professional CAD package. It continues to set the standard for price and performance on the desktops of engineers and architects.

2. Database CAD

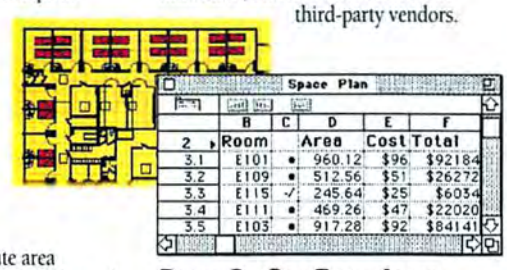
MiniCad+ has an integrated worksheet–literally, a spreadsheet and database in one–hot-linked to your drawings. Attach records such as type, cost or size and display at will. Compute area calculations, compile parts schedules and develop cost estimates.

3. Intelligent CAD

Our "Smart Cursor" automatically highlights, identifies and aligns relevant snaps, intersections, tangents and parallels. Snap to the precise point with more ease than you've experienced with any other program. We built the brains into MiniCad+ so you can think about more important things.

4. Programmable CAD

Don't be confined by your CAD program. Extend the capability of MiniCad+ by developing your own palettes with our macro language. We've included a wide variety of special-topic palettes with MiniCad+; others are available from third-party vendors.



Draw On Our Experience

Packed with features, the only thing small about MiniCad+ is the price. As a professional, you owe it to your desktop to ask your favorite distributor for the 1990 MacUser Editor's Choice winner in CAD, or call us for more information.

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Output from LaserWriterII NT, 300 dpi.



Output from LaserWriterII NT with Accel-a-writer upgrade, 1200 x 300 dpi, 150 lpi with 26 gray levels

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Works well with others. Accel-a-Writer is fully compatible with Adobe's® PostScript® page description language. It comes with 2MB of memory and expands to hold up to 16MB. What's more, our ISI technology lets you print from PCs and Macs simultaneously, without additional hookups or switching. All models feature AppleTalk, serial, parallel* and optional SCSI ports for maximum versatility.

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**Centronics® parallel interfaces not available for the original LaserWriter and LaserWriter Plus printers.*



Accel-a-Writer™

XANTE CORPORATION

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Shareware: Software that you use first and then pay for if and when you feel like doing so. Sort of like the overall attitude of the federal government about buying anything.

Freeware: Software with no strings attached. Sort of like the federal regulations governing S&Ls.

Feeware: The conventional method of software distribution, in which vendors expect users to pay for a product before they try it but which software pirates usually transform into one of the previous two categories.

Betaware: Software that still has some bugs in it. Buyers pay for it now to help fund the final stage of development and get a free upgrade when the bug-free version ships — if it ever does. Small, underfinanced, first-time software publishers give their betaware a version number of 0.9-something. Large, overconfident, veteran software publishers give their betaware a version number of 1.0.

Vaporware: Software announced long before it's ready to ship, designed to prevent customers from jumping ship to a competitor's cool new upgrade or to goad competitors into releasing betaware.

Where?ware: Vaporware that's more than 12 months late.

Wereware: Announced software that everyone assumes will be vaporware because the vendor has cried wolf too often.

Shelfware: Software nobody uses but everybody buys — mostly just so they can understand Robert Wiggins' frequent references to these products in his column.

ELFware: Hardware designed to reduce extremely-low-frequency radiation, bought by people who want to get John C. Dvorak's disparaging references to these products in his columns.

Selfware: Software that presents a conflict of interest for software-publishers-turned-pundits, which is why you won't find Guy Kawasaki making reference to certain products in any of his columns.

Be-ware: What the buyer should be of unsubstantiated rumors about what's going to emerge from Jean-Louis Gassée's Be Labs.

Look-and-feel-ware: Software that uses copyrighted metaphors for displaying information.

Scareware: The legal documents sent back and forth between look-and-feel lawyers.

Tupperware: The airtight case the look-and-feel lawyers think they have.

Airware: Sneakers that cost as much as top-notch software used to.

Heirware: Software that gets handed down to junior coworkers when you pop for the exorbitantly expensive upgrade.

Wash'n'ware and **Underware**: Software paid for with laundered money.

Stoneware: Software even Barney Rubble could understand — it runs under cartoon physics.



Introducing the next generation of cache boards for the 25 MHz Mac IIci. Turbocharged to speeds of 50 MHz, our PowerCache™ will make your IIci the fastest Mac alive.

Do you have more work to do and less time to do it? Our cache boards create the time you need to get it done.

NEW! **50 MHz PowerCache IIci™**
We put a 50 MHz turbo-charged CPU right on the cache board. Plug in and blow past the 40 MHz Mac IIfx. You can find it on the street at prices under two thousand dollars.

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If you already own a DayStar Fast Cache IIci, you can trade it in for big savings on a 40 or 50 MHz PowerCache IIci.

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Users please circle 160 on reader service card.



Story

He hunts heads with a single piece of software.

Mike Giddings has the power to move the football. His ratings reports are studied by 12 NFL teams several times a year.

Chances are, that hot running back you see inserted into the line-up mid-season came from one of Mike's reports.

More than 5,000 players are rated using dozens of criteria. There are hundreds of thousands of pieces of information in all.

How does Mike handle all this? And publish dozens of reports a year? With a staff of three?

With a single piece of database software called FileMaker® Pro.

With it, he can analyze data to a remarkable degree. FileMaker looks for certain attributes in a player's performance, weighs them, calculates performance, and displays the rankings in 200 different formats that Mike publishes for his clients. And he can do all this without computer expertise. He's a former coach, not a hacker.

Mike's reports give coaches an edge.

With FileMaker Pro, Mike has an edge, too.

Mike Giddings is just one of over a quarter-million people who benefit from FileMaker. You can, too. To see how, call 1-800-729-2292, ext. 20.

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The Mac Zone Established 1986

Our commitment to you:



AfterHours Software TouchBASE
TouchBASE is a database to keep track of personal and business contacts. It's handy all the time because it is a desk accessory. TouchBASE can print envelopes, labels, address books, fax cover sheets, and reports. It's even a multi-user product so you can share your database on a network or use it all by yourself.
TouchBASE $85

Fuji Floppy Specials
DS/DD 10 pk Rainbow $9
DS/DD 10 pk $7
HD Rainbow 10pk $15
While Supplies Last

Fonts & Clip Art

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Images w/Impact
Accents & Borders 64.
Business 64.
Graphics & Symbols 49.

Adobe
ATM Plus Pack 108.
Typeset I or II each 57.
Typeset III 115.
Smart Art Vol. I - IV each 59.
The Mac Zone stocks the entire line of Adobe Postscript fonts. Call for our low prices.

T/Maker - Click Art
EPS Business Art 82.
EPS Illustrations 82.

T/Maker - Click Art
EPS Animals & Nature 82.
Business Cartoons 31.
Business Images 31.
Personal Graphics 31.
Publications 31.
Holidays 31.
Christian Images 38.

Dubl-Click
Wet Paint 1-18 ea 39.
World Class Fonts 1-8 ea 39.

Tactic Software
ArtClip 1st Ed 49.
ArtClip 2nd Ed 64.
ArtFonts Pak 49.

Word Processing

A Lasting Impression
RésumExpert 47.
Cover Letters 47.

Caere
OmniPage 2.1 494.
The Typist 478.

Claris
MacWrite II 1.1 141.

Lexpertise U.S.A. Inc.
MacProof 3.2.1 114.

Deneba Software
BigThesaurus 63.
Spelling Coach Pro 3.1 123.
Comment 2.0 63.

Lifetree
Correct Grammar 2.0 54.

Microsoft
Word 4.0 244.

Paragon Concepts, Inc.
Nisus 3.0 244.

Personal Bibliographic
ProCite 195.

Preferred Publishers
Vantage 1.5 51.

SNA
Stylist 45.

T/Maker
WriteNow 2.2 116.

WordPerfect Corporation
WordPerfect 2.0 285.



DeltaPoint TASTE
TASTE blends the best and most often used features of wordprocessing, page layout drawing, and personal data management; integrating them seamlessly into one elegant, easy-to-use package. With multiple stationery documents, you control the document types you use most frequently.
TASTE $85

Graphics and Design

Adobe
Illustrator 3.0 w/ATM 348.
Photoshop 498.
Streamline 3.0 115.
True Form 224.
Type Manager 2.0 54.
Type Reunion 37.
Type Align 58.

Aldus/Silicon Beach
Design Team 888.
(Incl. Freehand, PageMaker and Aldus Pre-Print)
Digital Darkroom 2.0 258.
Personal Press 198.
Freehand 2.02 328.
PageMaker 4.0 498.
Aldus Pre-Print 328.
Super 3D 2.1 338.
SuperPaint 2.0 134.

Broderbund
Print Shop 34.
TypeStyler 1.5 114.
BannerMania 37.

CE Software
CalendarMaker 3.0 30.
Amazing Paint 64.

Claris
MacPaint 2.0 91.
SmartForm Designer 278.

Creative Software
Easy Color Paint 44.

Deneba Software
Canvas 3.0 Call.
UltraPaint 124.

Design Science, Inc.
Math Type 88.
Para Font 58.

Dynaware
DynaPerspective 599.

Electronic Arts
Studio 1 55.
Studio 8 2.0 188.
Studio 32 448.

Frame Technology
Frame Maker 795.

Foundation Publishing
Comic Strip Factory 36.
#1 Office Days 20.
#2 Kid Stuff 20.

MicroFrontier
Enhance 238.

Letraset
ColorStudio 644.
DesignStudio 488.
FontStudio 368.
ImageStudio 138.
LetraStudio 274.
ReadySetGo! 4.5 164.

Mainstay
ClickPaste Call.
Capture 4.0 Call.

Pantone
Computer Color Book 48.

Quark
XPress 3.0 518.

Salient
Partner 1.01 55.

Paracomp
Film Maker 438.
ModelShop 374.
Swivel Art 81.
Swivel 3D 1.1 294.
Swivel 3D Professional 438.

Solutions
Curator 75.
SmartScrap & Clipper 55.

SuperMac Technology
PixelPaint 2.0 224.
PixelPaint Pro 2.0 465.

Softview
if:X Forms Designer 168.

Tactic Software
FontShare 138.
Icon-It 44.

Preferred Publishers
Exposure Pro 68.
Master Color 102.
Master Paint 50.

TimeWorks
Publish It! Easy 2.0 135.

Zedcor Inc.
DeskPaint/DeskDraw 3.0 ... 113.



Motion Works ADDMotion
ADDMotion is the first animation and color paint program to be fully integrated with HyperCard 2.0. With ADDMotion you can quickly and easily add animation, color and sound to any HyperCard stack. It can be used by anyone who wants to create exciting presentations, develop interactive training systems, or simply have fun. ADDMotion includes HyperCard 2.0
ADDMotion $182

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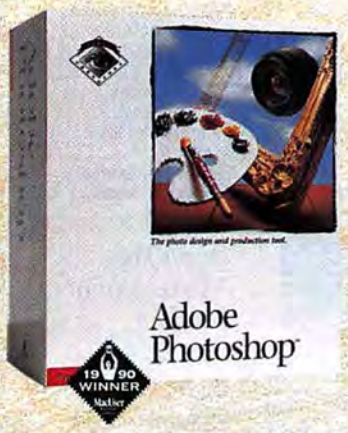
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Type On Call offers over 800 Adobe Type 1 fonts on a single CD-ROM in a new accessible format Get new fonts with a simple phone call to the MacZone. Simply by purchasing access codes over the phone, type users can obtain new fonts from the disk. Initial purchase entitles you to two free fonts of your choice and includes Adobe Type Manager 2.0. Type On Call is the quickest and easiest way to buy fonts – once you have the disc, every font is a simple phone call away!
Type-On-Call Introductory Price $48

Shining stars for the 90's

1990 Eddy Award Winners

The Mac Zone
Established 1986



Best Software Package of the Year

Adobe Photoshop 1.07

Adobe Photoshop is the affordable Macintosh image-processing program with enough power and versatility to be used as a paint, pre-press, color corrections and darkroom system. And it does is all in living 24-bit color. Whether you start with scanned photographs, slides, electronic art works of from scratch, Photoshop's full range of filters, painting, drawing and selection tools give you the artistic control and precision you've been missing.

Photoshop 1.07 $498



Best Connectivity Software

Farallon Timbuktu

Timbuktu links all the Macs on a LocalTalk network (with password protection). The Desk Accessory opens and closes files, and actually operates the software on another person's Mac. This makes Timbuktu especially good for training others on how to use an unfamiliar application. With version 3.1 you can now send files to others or let them copy to an from yours. And, you can operate files servers in distant rooms – from the comfort of your own Mac.

Timbuktu $92

Best Presentation Product, Best Development Tool and Best Utility



Symantec Products, MORE 3.0, THINK Pascal 3.0 and Norton Utilities

Symantec has three winners this year. The first was MORE, which is the best presentation-software package around as well as one of the premier outliners. THINK Pascal which has the most advanced and comfortable development environment on the Mac, is the benchmark for today's developmental environments. And Norton Utilities which has redefined the state of the art of data-recovery software. It speed ups disk-related work with an optimizer and a standard file-dialog box extender with high-speed file-finding capability. It can resurrect data from sick disks with its intelligent recovery tools.

More 3.0 $259
Think Pascal $160
Norton Utilities $83

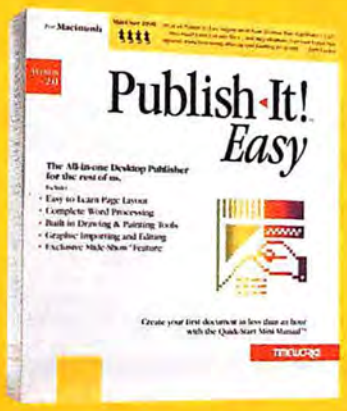


Best CAD Software

Graphsoft MiniCad + 3.0

MiniCad+ is a product that integrates a spreadsheet and a relational database into a drawing so you can keep track of costs as the design evolves. Database information linked to a particular object stays with that object even when it is cut and pasted into another drawing. MiniCad+ also has a built-in programming language and a "smart cursor" to aid in the finer points of drafting.

MiniCad+ 3.0 $585



Best Page Design Software

TimeWorks Publish It! Easy 2.0

Publish It! Easy integrates page layout, word processing (with spelling checker and thesaurus) and drawing and painting, so even beginners can produce attractive documents. It includes most of the features of Publish-It, but adds many useful new functions. Dynamic Text Flow reformats text when you adjust the size of text frames. Zoomable palettes disappear when you need screen space. With Multiple Undo Levels you can remove changes five steps back. Editable Thumbnails let you see and edit the entire page.

Publish It Easy $135

Best Financial Management Package

Reality Technologies WealthBuilder

WealthBuilder can help you plan for the future, whether it's retirement, college education, or a big vacation. You create 'what if?' scenarious based on different economic and personal assumptions, and WealthBuilder tells you how much you need to save. It can also suggest what portion of your savings should be in stocks, bonds, or pork bellies. A database of stocks and mutual funds contains information on ratings and performance for the past ten years, the information is updated quarterly.

WealthBuilder $144



Accounting & Finance

Absolute Solutions
Computerized Classic Accounting 223.

Check Mark Software
Cash Ledger 114.
MultiLedger 1.3A 234.
Payroll 174.

Chipsoft
Turbo Tax Mac1990 49.

Computer Associates
Simply Accounting 1.1 224.

In-House Software
In-House Accountant 135.

Intuit
Quicken 35.

Peachtree/Layered
At Once! 284.

MECA Ventures Inc.
Managing Your Money 4.0 134.

Nolo Press
For the Record 2.0 31.
Will Maker 4.0 36.

Reality Technologies
WealthBuilder 144.

SoftSync/Bloc
Accountant Inc. Pro 2.0 335.

Softview
Business, DOD & GSA Expense Reports ea. 49.
Personal Tax Analyst 49.

Softview
MacInTax 1040 1990 58.
State Supplements 48.
Tax View 1040 Pro 335.
if:X Payroll Tax Assistant 85.
if:X Personal Tax Analyst 47.
if:X Home Loan Assistant 63.

Software Toolworks
Dollars & Sense 5.0 58.

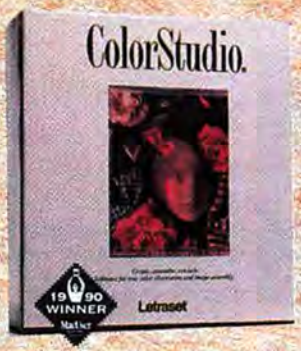
Survivor Software
MacMoney 3.5 58.

Teleware
M.Y.O.B. 142.

Timeslips Corp.
Timeslips III 2.0 194.

Your call in 3 rings*

*or shipping is FREE with your purchase



Best Color Prepress

Letraset ColorStudio 1.1

With ColorStudio, you can retouch, merge, correct, and create color images with the precision and control you've always wanted. ColorStudio takes full advantage of Apple's new 32-bit Color Quickdraw software though you'll need a video card and monitor capable of displaying 32-bit color). Also works in 8-bit mode. ColorStudio is compatible with most page layout software.

Color Studio 1.1 $644

Hyperware & CD's

Activision
- Cosmic Osmo CD ROM 45.
- Manhole CD ROM 33.

Addison Wesley
- HyperCard Script Language Guide 18.

DataDesk
- Hyper Dialer 30.

Farallon
- Media Tracks CD 318.

HyperPress Publishing
- Script Library 56.
- Script Expert 44.
- ICON Factory 44.

Motion Works
- ADDMotion 182.

ICOM Simulations
- Hyper TMON 2.8.4 57.

Individual Software
- Power Macros - HyperCard 34.

MacroMind
- Materials CD ROM 124.

Microsoft
- Office CD ROM 598.

Silicon Beach Software
- Super Card 1.5 198.

Wayzata Technologies
- Seals in the US Gov't 49.
- All of Mac Tutor 160.
- Disc Tracy 75.
- The USA Factbook 75.
- The CIA Factbook 80.
- The Middle East Diary 85.
- Quickart 174.
- Vietnam Remembered 69.
- GEM- Public Domain 75.
- Funhouse CD 37.



Best Data-Management Product

Fairfield Software ClearAccess

Utilizing a simple, graphical interface, ClearAccess allows a user to create SQL-type queries to most relational databases by just pointing and clicking on the data items they want. Queries can then be recorded as "Scripts" while they are being executed. ClearAccess makes host-based data access a natural and transparent part of the user's experience.

ClearAccess $405

Networking & Connectivity

Asante
- MacCon+II E & IIET 340.
- MacCon+II E ET 64Kb 375.
- MacCon SE E & ET 275.
- MacCon SE/30 E & ET 340.
- MacCon SE/30 64Kb 375.

Cayman Systems
- Gator Box 1,955.
- Gator Share Software 1,350.
- Gator Card E/II ea. 458.
- Gator Mail Q or M 10 user 675.

CE Software
- In/Out (1-5 user) 127.
- In/Out (1-10 user) 186.
- QuickMail 2.2
 - 1-5 users 207.
 - 1-10 users 307.
 - 1-50 users 1,567.

DataViz
- MacLink Translators 97.

DayStar Digital
- Local Talk Board
 - LT 200 MC 295.
 - LT 200 PC 185.

Dayna Communications
- EtherPrint 350.
- DaynaPort E/SE, II & 030 . 355.
- DaynaNET/4L 565.
- Speed guard collision filter . 52.
- DaynaTalk for Macintosh
 - Single 95.
 - 5 Pack 380.
 - 10 Pack 715.

Dove
- Ethernet
 - FastNet SE, SE/30 or FastNet III 340.

Farallon

LocalTalk -
- PhoneNET DIN-8 30.
- PhoneNET DIN-8 (10 Pk) . 195.
- PhoneNET DB-9 30.
- Star Connector (single) 17.
- Star Connector (10 Pk) 125.
- Star Controller 300 819.
- Repeater 309.
- PhoneNET/AppleTalk Adapt. 8.

Ethernet - PhoneNET cards include Timbuktu & RJ45 cable

Farallon
- PhoneNET EN Mac II 350.
- Mac II Card (10 Pk) 3,375.
- PhoneNET EN SE/30 350.
- Star Connector EN 120.
- Star Controller EN 1,588.

Star Wiring Kits-
- Star Controller LT/EN 62.
- Passive Star 62.
- Harmonica Block LT 62.

Timbuktu - One copy is required on every Mac
- Timbuktu (single user) 92.
- Timbuktu (30 user pack)1284.
- Timbuktu Remote 122.
- Remote Access Pack 848.
- Remote Wakeup Cable 31.
- Portable Pack 328.

MacRecorder Sound System
- Sound System 2.0 158.
- Voice Digitizer 100.

Int'l Business Software
- DataClub 3 users 198.
- DataClub 10 users 538.

Accessories

Avery Labels
- Mac Label Pro 48.

Casio
- Casio B.O.S.S. 219.
- CasioLink/Mac 98.

CoStar
- LabelWriter 184.
- Organizer 195.
- Organizer Jr. 68.

I/O Designs

Carrying Cases - Blue or Black
- Imagewriter II. 48.
- MacLuggage Classic/SE 64.
- MacLuggage II/IIfx 98.
- MacLuggage IIcx-ci-si 84.
- Ultimate Classic Case 84.
- The Ultimate SE 78.
- Ultimate Neon Carrying Case Green - Pink - Yellow 88.

Kensington Microware
- Dust Cover SE XKB 9.
- Dust Cover SE. 9.
- ImageWriter II Cover 8.
- Anti-glare Filter 32.
- SE Rad./Anti-Glare Filter 51.
- Anti-glare Filter 13" Apple ... 63.
- System Saver 63.
- System Saver SE 52.
- Universal Printer Stand 15.
- Mac II Stand w/o cable 19.
- Mac IIcx Monitor Stand 54.
- Mac II Monitor Stand 64.

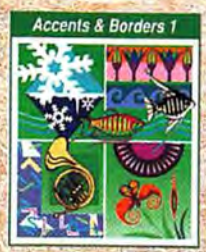
Kensington Microware
- Mac II Mon. Cable Ext. Kit ... 32.
- Masterpiece Mac II 105.
- Extended ADB Cable 24.
- Universal Copy Stand 22.
- Printer Muffler 80 43.
- Power Tree 10 19.
- Power Tree 20 27.
- Power Tree 50 54.
- Apple Security Kit 34.
- LaserWriter II Security Kit .. 32.
- A-B Box (DIN-8) 63.
- SuperBase 31.
- PowerBacker 360 269.
- PowerBacker 450 337.
- PowerBacker 520 397.
- PowerBacker 800 746.
- PowerBacker 1200 946.
- Pass Proof 70.
- SideClip 6.

Mac Packs - Linebacker

Navy, Wine or Gray
- ImageWriter Bag 45.
- Mac Plus/SE Bag 55.
- Mac SE Bag Xt 69.

Smack-a-Mac
- Smack-a-Mac Stuffed Mac ... 8.

Covers
- SE/Plus w/ext. keyboard 17.
- SE/Plus w/std. keyboard 17.
- Apple 13" monitor & ext. keyboard 18.



Best Data Resource

3G Graphics Accents & Borders 1

The numerous borders, ornaments, labels, and symbols in Accents and Borders are crisp black & white and finely crafted. Unlike most clip-art offerings, all 3G images are opaque and most are strategically subgrouped for easy separation into more images or quick color changes. Bonus color disk for registered users.

Accents & Borders 1 $64



Best Communicat Product

Global Villa Commu Tele

TelePort plugs into your ADB connector, like your mouse and keyboard, eliminating power adaptor, freeing your serial ports, and enhancing portability. TelePort's 2400 baud Hayes compatible modem incorporates MNP5 data compression/error correction.

TelePort ADB $129
TelePort Send Fax $185

Music

Ars Nova
- Practica Musica 68.

Bogas Productions
- Super Studio Session 2.0 ... 64.

Coda
- Finale 2.0.1 557.
- Mac Drums 30.
- MusicProse1 86.
- Perceive 49.

Great Wave Software
- Concertware+ MIDI 5.0 97.

Mark of the Unicorn
- Professional Composer 375.
- Professional Performer 375.

OpCode
- EZ Vision 99.
- MIDI Translator 42.
- MIDI Play 42.

Passport Designs
- MasterTracks Pro 4.0 315.
- MIDI Interface 75.
- Note Writer II 295.
- Sound Exciter 48.

PG Music
- Band in a Box 57.

Tactic Software
- Sound Clips 1-4 ea.45.

Best Animation Program

Paracomp FilmMaker

The Eddy Award winning FilmMaker is the masterful animation and multimedia graphics program. This amazing application allows the user to create professional quality presentations and animations quickly and easily! What takes hours to create in other applications can now be done in just minutes with FilmMaker. Whether you're a professional animator who wants to create stunning effects for video, or just someone who wants to put their ideas in motion – FilmMaker is the ultimate answer.

FilmMaker $438



Our MacAdvisors will answer

Accelerators & Upgrade Boards

Applied Engineering
Classic 1MB Upgrade 135.
Quadralink 204.
Mac Ram Portable 1MB 385.
Ram Portable 1MB SIMM .. 320.

Connectix
Virtual - Mac II 124.
Virtual - Mac II w/PMMU ... 187.
Virtual - SE/30, IIx, IIcx 114.

DayStar Digital
PowerCache 030 II ci
40Mhz w/o FPU 995.
40Mhz w/FPU 1225.
50Mhz w/o FPU 1750.
50Mhz w/FPU 2050.
Fast Cache IIci 280.
PowerCard 030
25Mhz II, IIX 1,115.
33Mhz II, IIX 1,495.
40Mhz II, IIX 1,650.
50Mhz II, IIX 2,245.

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SCSI Accelerator - w/o SIMMS
SCSI PowerCard 1,025.
RAM Expansion - w/o SIMMS
RAM PowerCard 625.

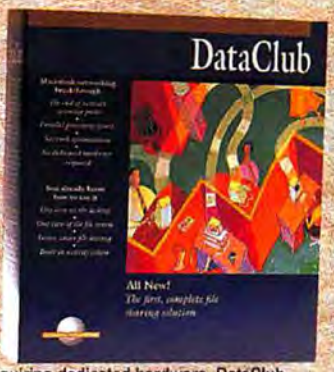
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Mac 86 v.3.0 444.
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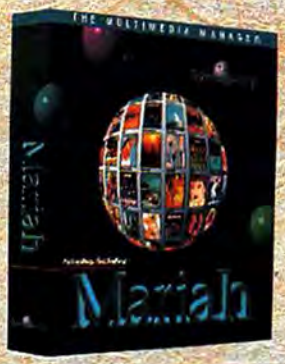
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16 Mhz for SE 360.
Gemini
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25 Mhz 030 965.
Gemini II
33 Mhz 030 1150.
46 Mhz 030 1275.
Quicksane 45.
QuickCache IIci 315.
GemKit *(Required to install the Gemini or Gemini II boards in any Mac below an SE model. Includes internal fan. SCSI port.* Specify US or Int'l vers.) ... 125.

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DataClub 3 Pack $198
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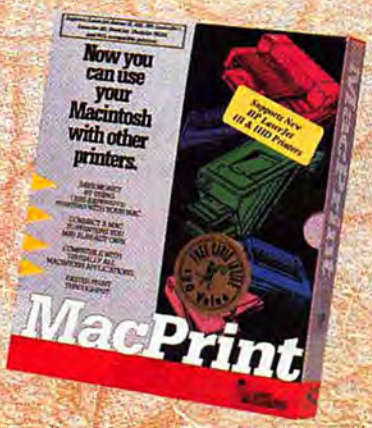
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Insight Development MacPrint

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MacPrint $88



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Navigator 3.0 48.

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DoveFax Plus 395.

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Shiva Corporation
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True BASIC Language 2.02 .. 54.

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Quark XPress 3.0

XPress 3.0 boasts a more intuitive user interface, many new features, plus redesigned and reorganized documentation. New measurement and page palettes provide the user with interactive onscreen access. A library stores frequently used items, and a pasteboard provides a work area next to each page. You can group text and graphics as single elements, and rotate them a full 360 degrees in 0.001 degree increments Color trapping ensures precise color printing. XPress was also awarded Honorable Mention in both Best Color PrePress and Best Page-Design catagories in the MacUser Magazine Eddy Awards.

XPress 3.0$518



Dantz Retrospect 1.2

With Retrospect, you can remove seldom-needed files to permanent storage, and free up space on your hard disk. It works with almost any media, from floppies to rewritable optical discs. Retrospect maintains a catalog on your hard disk so you always know where to look for your archives or back up files.

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Retrospect 1.2$143
Retrospect 10 Pk Remote$149

Education

Addison Wesley
Inside Macintosh, Vol. 1-5ea 18.
Inside Macintosh, X-Ref 8.
Mac Programming Primer .. 21.
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Programmers Online Companion 2.1 35.

Bright Star
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Zedcor DeskPaint 3.03

DeskPaint is a 98K DA that works as well with black & white images on a Macintosh Plus or Classic as does with color images on a IIsi or IIfx (even in 24-bit color). It reads and writes PICT, TIFF, and MacPaint files it does smoothing, auto-trace, graduated fills, multiple windows, and a lot more. DeskDraw is a DA comparable to MacDraw. Some of it's features include hairlines, rotated text and arrows. It reads and writes PICT files compatible with SuperPaint, MacDraw II and Canvas

DeskPaint 3.03$113



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UnMouse $180

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Multi-Mode Monitor$1475



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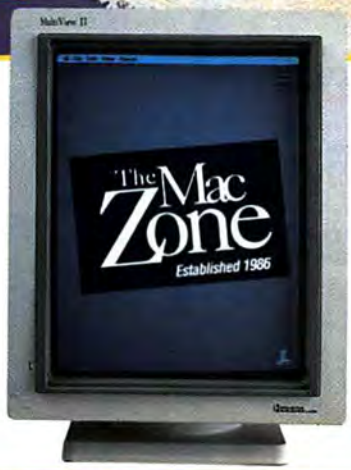
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R45 PLUS Removable Hard Drive $589



LaCie Tsunami

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40 Mb Drive $550



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40 mb Hard Drive $299



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40 Turbo Removable $750

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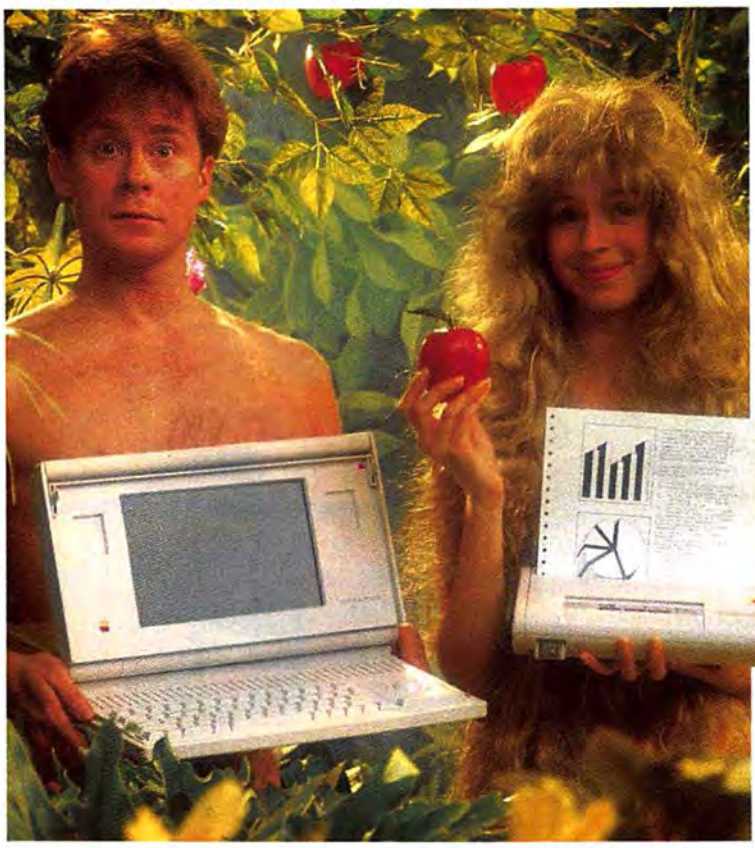
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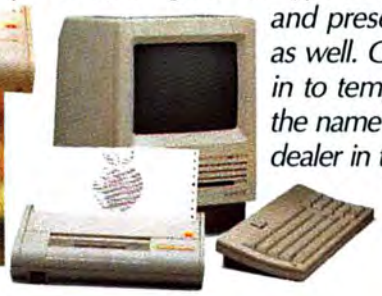
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ROBERT WIGGINS

Death and Taxes



Fortunately, Mac users can avail themselves of a variety of products — from MacInTax to WillMaker — to help deal with life's little inevitabilities.

As April 15 approaches, you start hearing that old saw about Death and Taxes again. That's because it's true. But the Mac can help, to some extent, in both areas.

Take taxes. They may not be avoidable, but they can be managed. And the Mac's graphics capabilities make it perfect for running software to help you with your taxes. You won't even have to worry about copying information by hand or lining up forms in your printer, because the Mac can print reasonable facsimilies of completed tax forms.

At present there are two major tax-preparation packages: MacInTax, from SoftView (1721 Pacific Avenue, Suite 100, Oxnard, CA 93033; [800] 622-6829) and TurboTax, from ChipSoft (P.O. Box 85709, San Diego, CA 92186; [800] 755-8829). Both offer a wide range of forms and schedules, and both can print beautiful copies of tax forms on a LaserWriter or other high-resolution printer.

MacInTax is the original Mac tax package. All tax packages must be revised annually just to keep up with changes in the tax codes, but the 1990 version of MacInTax has also been upgraded with more tax forms, more on-line help, improved speed, additional error-checking, and so on. The package costs $99, plus $69 for any one of 13 state-forms modules.

In a way, MacInTax is responsible for the whole forms-processing boom, and SoftView also markets a line of general forms-processing packages called if:X.

TurboTax, a port from the DOS world, is a newcomer to the Mac. TurboTax costs $89, plus $49 for any of 11 state-forms modules. Although either MacInTax or TurboTax can help you fill out the 1040 forms as well as all the associated forms and schedules, each program takes a slightly different approach and each has a very different feel.

You don't have to buy a tax-specific package to prepare your taxes on your Macintosh (although I certainly recommend it). You can use any spreadsheet program for this task, and there are some relatively inexpensive Excel templates available from Heizer Software (1941 Oak Park Blvd., Suite 30, Pleasant Hill, CA 94523; [800] 887-7667 or [415] 943-7667). A full personal-tax-forms package costs $39, plus $19 for any one of nine state-forms modules.

But remember, doing your taxes with a spreadsheet program means more effort on your part. MacInTax and TurboTax do a lot of the hard work for you. Of course, no matter what software you use to prepare the actual forms, you're responsible for collecting the data and sorting through your records.

Plan Ahead

Once the immediate pressure of April 15 has passed, you should start planning for the 1991 tax year. Tax advisers recommend that you finish planning by December at the latest, so you can have all your options available.

With all the limitations the IRS places on itemized deductions, for example, some experts recommend itemizing your deductions only every other year. This lets you delay as many deductible expenses as possible into January, take as many as possible during that year, and even pull some for the following year back into that December. Once you've gotten to April, these kinds of options aren't available.

Tax-preparation packages have value as tax planners, even just for playing "what if" games, but more-specialized packages are available. For example, SoftView offers if:X Personal Tax Analyst ($79), as well as MacInUse ($99). MacInUse tracks how long you spend doing things on your Mac (a must if you want to deduct the business use of your personal Mac).

You might find some general financial-planning products useful as well. Andrew Tobias' Managing Your Money, from Meca Software (327D Riverside Avenue, Westport, CT 06880; [203] 222-9150), is a best-selling package that keeps track of your personal finances. Managing Your Money also has many tax-planning features built in (enough so that it too requires a new version each year as the tax laws change). The manual also doubles as a financial-advice column by Tobias, and many people appreciate his quick wit when facing a financial morass.

Two other popular personal-finance packages are Quicken, from Intuit (P.O. Box 3014, Menlo Park, CA 94026; [415] 322-0573), and MacMoney, from Survivor Software (11222 La Cienega Blvd., Suite 450, Inglewood, CA 90304; [213] 338-0155). Quicken costs $59.95, and MacMoney is priced at $119.95. Neither has as many tax-planning features as Managing Your Money, nor are the manuals as entertaining. Their bank-account-management capabilities match those of Managing Your Money, however.

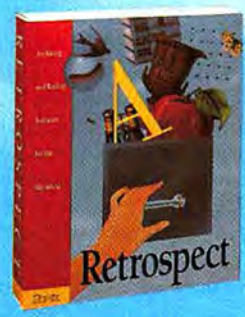
For a new slant on financial-planning software, consider WealthBuilder from Reality Technologies (3624 Market Street, Philadelphia, PA 19104; [215] 387-6055). This $250

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Dealing with Mister D

With all these products, you may feel well prepared to deal with your taxes. But what about death? Can the Macintosh help there too? Yes, it can, thanks to WillMaker 4.0, for $69.95, from Nolo Press (950 Parker Street, Berkeley, CA 94710; [415] 549-1976).

WillMaker has been available for years, and this new version offers only minor improvements, but, as with all legal and tax software, you should always use the latest version. If you want a valid will without having to hire a lawyer, WillMaker is for you. It leads you through creating a will by asking a series of questions. The excellent manual is more a tutorial on wills than it is a software manual. Although it's not the most polished package you'll see this year, WillMaker is utilitarian and can create a valid will for you no matter which of the 50 states you live in.

One problem that applies to both estate planning and tax planning is keeping track of all your records, receipts, and important papers. Nolo Press has a package, For the Record 2.0, that is essentially a database program designed to keep track of your important documents, inventory your assets, and collect all your personal information in one place. It costs $59.95.

There are also many specialized HyperCard stacks for tracking your records. The stacks are available as freeware or shareware (check with your local user group, BBS, or on-line service); none of them are as complete as For the Record, though, and you may need two or three of them to cover all the possibilities. You can also write your own HyperCard stack or database program, but that would be a lot of work.

None of this software will let you evade the inevitable. But while you're waiting for that dreaded call from the IRS (or worse!), at least you have the satisfaction of knowing that your Mac has prepared you for whatever may be in store.

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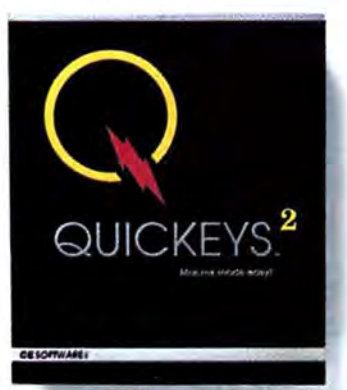
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I Love Mail



Readers write Guy Kawasaki regularly, but it's not always fan mail. Whether you come to praise him or to bury him, Guy wants you — yes, *you* — to write him too.

It's been a year since I began writing this column for *MacUser*. In that year, I've learned a lot about what kind of people read *MacUser*.

During this past year, I got love mail and I got hate mail. I did not get love/hate mail. My mail came from NRA members, civil libertarians, ministers, and Apple shareholders. My mail isn't namby-pamby, wimpy form-letter stuff. Here's what I mean.

Rabid

MacUser readers are rabid (according to *Webster's New World Dictionary, Third College Edition, rabid* means "fanatic or unreasonably zealous in beliefs, opinions, or pursuits"). Let me share some rabid mail.

"It's disappointing to see Guy join the liberal goon squads that find it trendy to assassinate the character of the NRA by misrepresenting its position." Lynn Muzzy.

More on the NRA: "Mr. Kawasaki, if someone has called you or someone you love an unkind name or has committed some act of violence based upon bigotry, stand and take it like a man. Move on. Your attitude is affecting your job and ultimately, your livelihood. Yes, Mr. Kawasaki, I am a member of the NRA, and yes, I bear arms" Paul Schwarz.

"Your piece on Singapore in the October 1990 issue makes it seem that you either don't know or don't care about the widespread concern over that country's increasing restrictions on freedom of expression and other basic human rights." Angus MacDonald.

More on Singapore — this comment is a little al dente: "I'm glad Guy had a ball in Singapore. He'd probably have enjoyed Mussolini's Italy as well. After all, didn't he make the trains run on time? Good pasta too." Richard Pachter.

All I can say is that in Singapore everything runs on time, and the satay is good too. The funny thing is that Singaporeans liked the column. This must be a coincidence. Prime Minister Lee Kuan Yew recently retired from office; maybe he'd like the vice-president-of-marketing job at Apple. He could reposition the Portable as the "Singapore Sling."

Reasonable

MacUser readers are reasonable people, so don't misinterpret these quotations. They feel passionate about things. They must — they bought Macs instead of You-Know-Whats from You-Know-Whom. I believe that it's quite reasonable, and even desirable, for people to write passionate mail to me — positive or negative.

That's because I enjoy getting mail — any kind of mail. I try to respond to all the letters. Here's a case where I really wooed a reader back: "In answer to your letter, to the contrary, I do not *hate* your column in *MacUser*." Richard Greenstone. You see that? I really know how to charm people. Richard ended up sending me his HyperCard stack about the Copyright Act of 1976 and a copy of the law journal he edits.

Funny

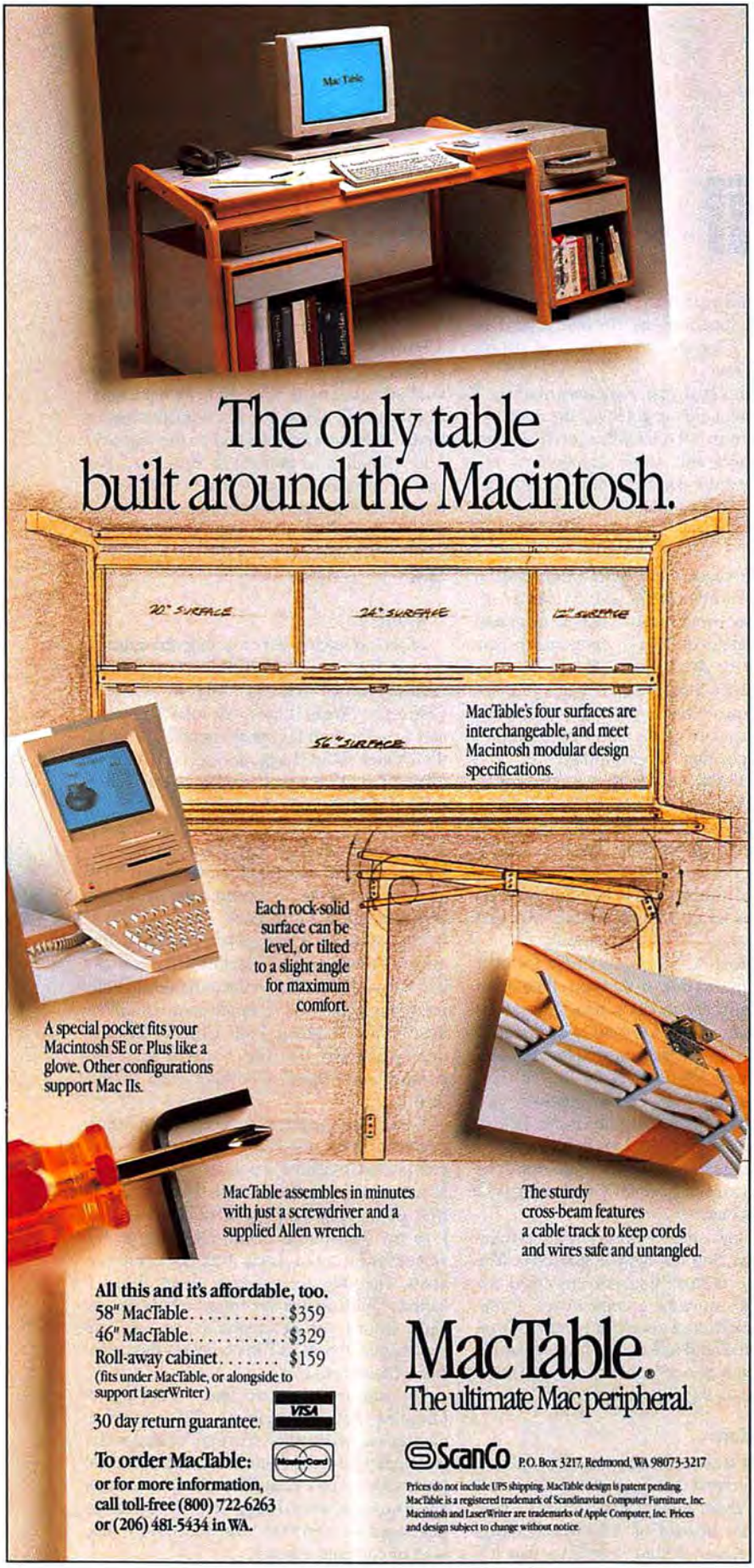
MacUser readers have a wonderful sense of humor. The funniest line was in a letter from a minister named William Lesch in Southern California: "Well, I know who John Sculley is, and a pastor with his speaking ability should think twice about changing careers." Come to think of it, I've never seen a pastor use a Religion Navigator video.

Here are a few more good ones: "I have often wondered why Apple was so slow to meet customers' demands for lower-cost CPUs and who the idiots were behind the flying-car commercial." Scott Bittnick.

"If I thought it would help, I'd take the money I'm saving for a Macintosh IIsi and use it to buy Apple stock in order to be able to vote for your election to the Apple board of directors." Chris Bergman. I told Chris to take his money and buy that IIsi. I was at least six million votes short of being elected to the board.

Speaking of Apple, all my columns on Apple generated the same kind of letters. Most of them started like this: "I bought my first Apple II ten years ago. Since then, I've bought a Macintosh 128K and upgraded it to a Plus. I love my Macintosh, but in all those years, whenever I went to Apple dealers, they never knew what they were talking about. When I called Apple, no one ever returned my phone calls. I hope you get appointed so you can change that. P.S. Now I'm saving my money to buy a Macintosh IIci."

Do you see a pattern there? People are longtime Apple customers. They receive nothing but bad service. Yet they're anxiously anticipating the next time they can afford to buy another Apple computer. If any of you are agnostics or atheists, I suggest that you rethink your position. Only God can account for this kind of company loyalty.



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Critical

MacUser readers are critical. This is good, because good criticism yields good columns. The best criticism of my writing was this: "Conspicuous cleverness can be overdone. When it's merely 'cute,' it can be mildly annoying and easy to overlook (we all show off occasionally). But when it's used to make *MacUser* a vehicle for snide editorializing on issues totally unrelated to the Mac, it needs to be confronted." Robert Mathews.

Robert continues to say, ". . . Mr. Kawasaki's being a Macintosh expert does not necessarily make him an expert (or even well informed) on guns, criminology, or politics I am not advocating that *MacUser* censor Mr. Kawasaki or other columnists. I am suggesting that readers, as well as editors, let columnists know that they expect responsible, appropriate, and authoritative columns."

Not much I can say to that. Robert pretty much sliced and diced me. There's nothing I like more than a good case, and his case was superb. There's only one problem: If I were restricted to "authoritative" columns, I couldn't write one every month — if you know what I mean.

Caring

Above all, *MacUser* readers are caring. I believe that even my most passionate critics care about Macintosh, *MacUser*, and me as a person. Therefore, please keep those letters coming.

I prefer to get letters electronically. Try *MacUser*'s own Zmac service on CompuServe (GO ZMAC: MACUSER); CompuServe: 76703,3031; America Online: MacWay; or AppleLink: Kawasaki2. Or you can send me a fax. My fax number is (415) 326-2398. But in fact, I'll take letters any way you want (even via U.S. mail — try c/o *MacUser*). Including your fax number makes it much more convenient for me to respond.

If you do write me, next year you may see your letter appear in this column. Assuming, of course, that I can come up with 11 other authoritative columns in the meantime. You can even help in this area. I would love to get suggestions about future column topics.

Speaking of caring, let me close with a quotation from a letter from the Rev. Peter McKnight. "You may find, if you haven't already, that 'the power to be your best' doesn't come from a box full of microchips; it comes from a relationship with the God who lives." Amen to that.



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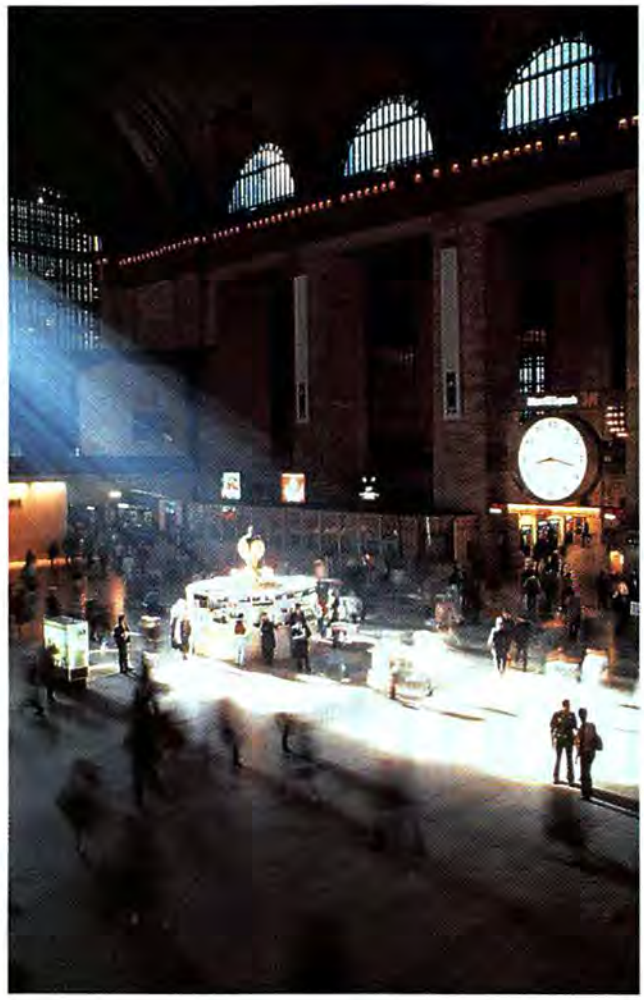
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SYSTEM REQUIREMENTS: System Tools 6.0.2. Supports MultiFinder. Operates on a Mac Plus or higher with 1 Mbyte. Hard disk is recommended.



NEW ON THE MENU

More than meets the eye Because the human eye can't distinguish 16.7 million hues, you'd think that 24-bit color would be enough for anyone. Apparently not. Strata ([800] 869-6855), the maker of StrataVISION 3d, has announced StrataVision Paint, a 64-bit-color painting program it claims can reproduce 281 trillion colors — once a 64-bit-color standard has emerged. Sometimes you can get more than you paid for — whether you know it or not.

By Russell Ito

Small is big . . . Whether it's miniskirts or miniburgers, there's big business in getting small — and that's especially true when it comes to data. With files frequently reaching multimegabyte sizes, data compression is a hot topic and the acronym of the moment is JPEG (Joint Photographic Experts Group). ☆ JPEG compression is an international standard for still images that's platform-, hardware-, and software-independent, so a JPEG-compressed file can be decompressed with any system that supports the standard. These compression ratios are as high as 50:1. Of course, when you squeeze your bytes that hard, some of them can get squeezed out permanently, but that's part of how the JPEG standard works: It eliminates redundant color information that your eyes can't distinguish anyway. With the JPEG specification nearing final revision, the first JPEG products are hitting the market.



Radius' ImpressIt is a software-only package. Until now, software JPEG has been considered far too slow to be usable, but this package from Radius ([408] 434-1010) is nearly as fast as hardware JPEG and costs significantly less — $179. ImpressIt lets users selectively preview the effects of compression and even select areas within an image to compress.

Storm Technology ([415] 322-0506) straddles the hardware/software line with PicturePress and the PicturePress Accelerator. Although the PicturePress software can do the job alone, adding the accelerator makes it much faster. The accelerator card is unique in that there are no custom chips on it. The heart of the card is a pair of AT&T DSP (digital-signal processor) chips that aren't dedicated to compression. The 60-megahertz DSP chips are software-programmable, so if the JPEG standard changes — as it has frequently over the course of its development — Storm has only to change its software, meaning that users never have to worry about hardware upgrades. (Micron Technology [(208) 383-4000] also sells the Storm products as the ICDP-II.)



Up to Date . . .

StuffIt Deluxe, Aladdin System's compression standard, is now in version 2.0. Improvements include self-extracting files and automatic application launching from a compressed document. $99.95. (408) 685-9175. ☆ VideoQuill, the type-manipulation package from Data Translation, now includes an optional FontPack that formerly doubled the cost of the package. The bundle price is $695. (508) 481-3700. ☆ Transform, Spyglass' data-visualization package, has been upgraded to version 2.0. The enhancements include color contour, surface, and vector plots and support for fast Fourier transforms. $395. (217) 355-1665.



The Ektaplus 7016 is a 16-ppm printer with a built-in copier. Its multiple ports let Macs and DOS machines share it, and make it an ideal network printer — plus it's a bargain.

Kodak's Printer Plus

It's been a long time since we could call a printer unique, but the Kodak Ektaplus 7016 earns the description. If there ever was a printer that could claim to be a one-size-fits-all unit, this may be it — and it's a bargain.

The Ektaplus 7016 is a 300-dpi 16-ppm (page per minute) printer that has on-the-fly emulation switching. It can be configured with up to four ports, all of which are live; it comes loaded with five standard emulations (HP-PCL, HP-GL, Diablo630, IBM Proprinter, and Epson FX80); and Adobe PostScript is available on a board. With its four ports, the Ektaplus 7016 can handle four different emulations simultaneously and switch among them for each print job, so Mac and DOS users — and networks — can share it.

But the Ektaplus 7016 is more than just a printer. It also includes a 6-ppm convenience copier, which lets you interrupt a print job, make copies, and then continue printing just by pressing a button on the front panel. Kodak also includes a Chooser-level driver that supports dual paper trays (either sequenced or continuous), and the Ektaplus 7016 also features a manual envelope feeder.

The guts of the Ektaplus 7016 include a Motorola 68010 processor for all the I/O activity and 2 megabytes standard on the motherboard (it can be upgraded to 4 megabytes). The Adobe PostScript board includes 35 Adobe outline fonts and adds a Motorola 68020 and 4 megabytes of its own strictly for handling PostScript imaging. In fact, the 68020 is so dedicated to its task that the 68010 has to poll it to send the print job to the engine; the 68020 doesn't send any messages. The Ektaplus 7016's engine is an LED unit designed and built by Kodak that has no moving parts.

So how much does all this cost? That's the best part. Fully configured for the Mac, the Ektaplus 7016 lists for less than $7,200.

Eastman Kodak Co., Printer Products Division, Rochester, NY 14653; (800) 344-0006. Ektaplus 7016PS, $6,995; AppleTalk port, $195.

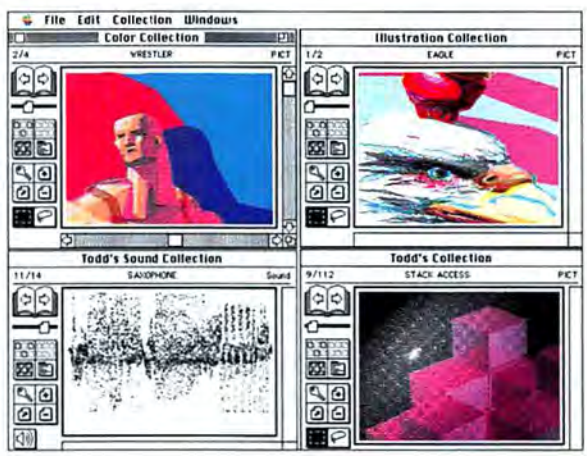
A Multimedia Cataloger

The more you do on your Mac, the harder it is to stay organized. Symmetry's Mariah is a cataloging utility designed to help you store and search your files.

Mariah creates named "collections" of picture, text, and/or sound files. You can have up to 32,000 items in a collection, and you can associate an unlimited number of keywords with each file. Performing a keyword search is fast and doesn't require a disk index. Collections can be browsed through in a thumbnail view, and the package even permits some limited sound editing.

Because Mariah doesn't compress files, it doesn't necessarily save disk space. Because the program doesn't recognize proprietary formats, files must be in generic formats such as PICT, TIFF, EPS, text, SND, and so on. Symmetry may add proprietary file-format capabilities to the next version of the program. Meanwhile, don't be surprised if you start seeing some CD-ROM discs being distributed in Mariah format — Symmetry is working on it.

Symmetry, 8603 E. Royal Palm Road, #110, Scottsdale, AZ 85258; (602) 998-9106. $149.



Mariah is a multimedia cataloger that lets you associate keywords with your files so you can find your documents quickly.

Making Meetings: Meeting Maker

Meetings are the bane of every working person's life, and often the only thing worse than attending a meeting is the hassle of setting it up. ON Technology's Meeting Maker is an attempt at eliminating this hassle.

A multiuser scheduler, Meeting Maker doesn't require any networking software, because it uses ADSP (AppleTalk Data Stream Protocol). An INIT/DA combination, Meeting Maker gives you a 24-hour calendar in 1- to 14-day views. You can choose to keep your appointments secret or share them with others. When you want to schedule a meeting, you simply select the attendees (you can designate optional attendees as well). You can also schedule facilities such as rooms and equipment. Meeting Maker supports named groups, and you can alter a group for a particular meeting without permanently changing the group.

As you assemble a list of attendees, Meeting Maker shows you a composite schedule that displays the available times for all the attendees. You can choose a convenient time yourself or have Meeting

Maker automatically pick the first available time slot that matches the length you want. Once you've sent a message regarding the meeting, Meeting Maker lets you know who has agreed to attend and updates all the calendars involved. If you cancel the meeting, the calendars are updated appropriately.

If you spend nearly as much time scheduling meetings as attending them, Meeting Maker is for you.

ON Technology, Inc., 155 Second Street, Cambridge, MA 02141; (617) 876-0900. Five-user pack, $495; ten-user pack, $895.

Envelope Writer

What's kept the typewriter alive? The envelope. Just ask anyone who's ever tried to address one with a laser printer. CoStar's AddressWriter, however, may finally put an end to the typewriter.

The AddressWriter is a 144-dpi dot-matrix printer designed specifically for addressing envelopes — not labels, although an optional label feeder is available. The AddressWriter prints with 24-pin quality, and it can hold up to 100 envelopes. Using a special version of MacEnvelope that comes with the unit, the AddressWriter can print return addresses, logos, and postal bar codes, all from a DA.

A serial AddressWriter should start shipping in May, and an AppleTalk version is expected to follow. Pricing for the AppleTalk unit hadn't been determined at press time, but it was expected to be more expensive than the serial edition.

CoStar Corp., 22 Bridge Street, Greenwich CT 06830; (800) 426-7827 or (203) 661-9700. $595.



Pixar Showplace is a 3-D-photo studio. You arrange and light your objects and give them a surface in Showplace and then render the whole image in MacRenderMan.

Pixar Perfect

MacRenderMan is great for rendering images but not for composing them. Enter Showplace, Pixar's 3-D-composition program that's the software equivalent of a photo studio.

To create a scene in Showplace, import an object created in a 3-D-modeling application or pick an object from Pixar's ClipObjects library, which is bundled with Showplace. The next step is to position wire frames of the objects as desired. You can give each figure a surface, using Pixar's First Looks (also included with Showplace), and light sources (lamps, spotlights, windows) can be added. You can set up a camera to "shoot" the picture, and Showplace produces a prototype 3-D rendering. If the prototype is acceptable, the image is then photo-realistically rendered with MacRenderMan. Showplace renderings can be saved as TIFF or PICT images for use in other applications.

Pixar, 1001 W. Cutting, Richmond, CA 94804; (415) 236-4000. $695.



CoStar's AddressWriter isn't a sculpture of the Excel 3.0 icon. It's a 144-dpi dot-matrix envelope printer that can produce 24-pin print quality.

NewsLine

Reports and Analysis

Apple's '91 Plans

PALO ALTO, CA — According to Apple CEO John Sculley and COO Michael Spindler, Apple is positioned to ride out the 1991 recession on the back of the Mac Classic and the company has some significant product plans for the rest of the year. At a press briefing, Sculley conservatively estimated Mac Classic sales at 600,000 units during the fiscal year, but some analysts suggested that Sculley's estimate could be low by as much as 135,000 machines. During the briefing, Sculley and Spindler also promised that System 7.0 would ship by midyear and that Apple will produce a notebook computer by the end of the year. Apple's partner in the notebook-computer project is widely believed to be Sony.

3Com Shrinks and Splits

MOUNTAIN VIEW, CA — As part of a major repositioning, 3Com laid off 12 percent of its staff (235 people) and transferred its LAN Manager extensions to Microsoft. 3Com plans to focus its energies on its Ethernet adapters and internetworking products. Microsoft received directory services and connectivity extensions that it plans to roll into LAN Manager 2.0. 3Com will develop 3+Open for Macintosh, which will run under LAN Manager 2.0. Full Mac connectivity is expected in LAN Manager 2.1, which Microsoft is expected to release by year's end.

dBASE Denied

LOS ANGELES, CA — In a stunning blow to Ashton-Tate, U.S. District Judge Terry Hatter has nullified the publisher's copyrights on dBASE, ruling that Ashton-Tate had failed to disclose that the program was based on an earlier application developed at the Jet Propulsion Laboratory in Pasadena. The JPL program is in the public domain, so Judge Hatter's decision may make it possible for anyone to obtain dBASE for free. The ruling also opens the door for other possible copyright challenges against companies that fail to disclose to the U.S. Copyright Office all information about similar software predecessors.

Motorola's Japanese Memory

SCHAUMBERG, IL — Despite the recent opening of a chip-manufacturing plant in Austin, Texas, Motorola will produce its four-megabit DRAM chips in a plant in Japan. Motorola jointly owns the Japanese plant with Toshiba.

ANIMATION

FilmMaker

This year's winner of the Eddy award for the best animation program of 1990 is a powerful animation tool with a decidedly unique personality.

FilmMaker, a French program co-developed and distributed in the U.S. by Paracomp, combines some astonishing animation capabilities with enough Gallic quirks to temper your artistic ambitions. In fact, FilmMaker is actually *five* separate application modules (just counting the major ones), which in itself can be pretty exasperating — until the logic behind the design has had a chance to reveal itself.

Animation Bound

FilmMaker definitely has limits. It's an animation package, but it doesn't include any graphics software for creating pictures from scratch. Instead, you create your images in a painting or 3-D program and then import them into FilmMaker as PICT, PICS, or EPS files.

If you want to sequence images into a classic frame-by-frame animation, FilmMaker isn't for you, because it doesn't allow for precise registration of individual frames. But if you need to perform complex motion studies and need to make minute adjustments to that motion quickly and accurately, or if you need to manage the color palettes of several completely different graphics in an 8-bit environment, *then* FilmMaker is an animation application that will interest you.

The initial difficulty with FilmMaker is easy to understand: Developed by the French company Encore Development, FilmMaker sometimes seems to not have entirely made the transition from its origins as an in-house tool to its new role as a mass-market product. Its modularity, sample graphics-file titles that are still in French, and a quick-start tutorial that's short of examples of what FilmMaker can really do all suggest that FilmMaker was rushed to market prematurely. When you begin to work with the product, however, its shortcomings are counterbalanced by its strengths or, as is the case with FilmMaker's modularity, actually prove to be a virtue. For example, even though it's less convenient than an integrated approach, FilmMaker's modular strategy leaves a lot more memory available for RAM-intensive activities such as sequence rendering.

Complex Animation

If FilmMaker seems dense and confusing at first, it's because the program can perform some fairly complex chores. FilmMaker requires a Mac SE/30 or a Mac II-family CPU, with 32-bit QuickDraw activated. The five primary application modules are Mark, Animate, Color, Sound, and Present. FilmMaker also includes a utility for exporting animations to HyperCard and a DA for converting images into bit maps (FilmMaker's format).

In Mark, you create a simple outline, or tracing, of a graphic that is referenced to a PICT, PICS, or EPS file. The outline is a guide that lets you create, view, and alter your animation quickly without having to wait for the machine to redraw a complex color image.

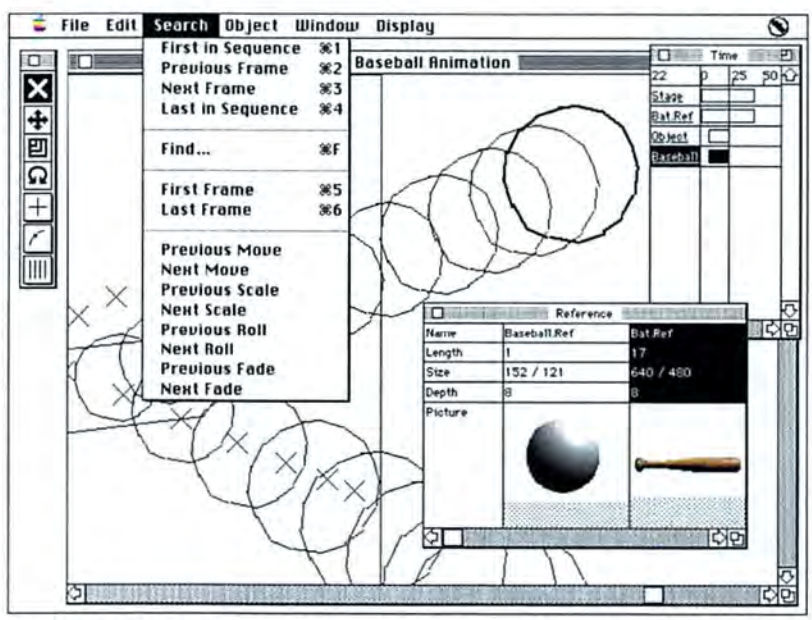
The Mark outline is then manipulated in the Animate module, where you control scale, position, path, and acceleration over time relative to an anchor point/vanishing point. (The anchor point is an object's center of gravity, and when you scale an object, the anchor point becomes the vanishing point.)

One of FilmMaker's wonderful features is that you can link objects to each other or to other, "invisible" objects that independently control some aspect of the object's size or motion. These linked objects can be ganged to create complex animation paths, or, more significantly, they can be linked to other components in a hierarchical fashion that seems to let your artwork move independently while ultimately being controlled by a master object.

You create a path simply by dragging an object with the move tool. You can then change the animation path and instantly view your alterations, because FilmMaker displays all the key frames.

Dialog boxes give you fine control of various animation commands, and there's a basic array of transitions as well. You have complete control over the transparency of the images in an animation, so graphics can fade in, fade out, or superimpose over other images. FilmMaker transitions include dissolves, fades, and wipes.

When you decide that you're ready to



FilmMaker is a French import that takes a modular approach to animation. The Animate module gives you control over the path, scale, and transparency of your graphic objects. The Tool palette controls paths and scaling, and transparency is set in a dialog box.

have your sequence rendered, a dialog box lets you select the bit depth and gives you a choice of system or custom color palettes, Antialiasing and Dithering options, and an Antiflickering option for single-frame output to video.

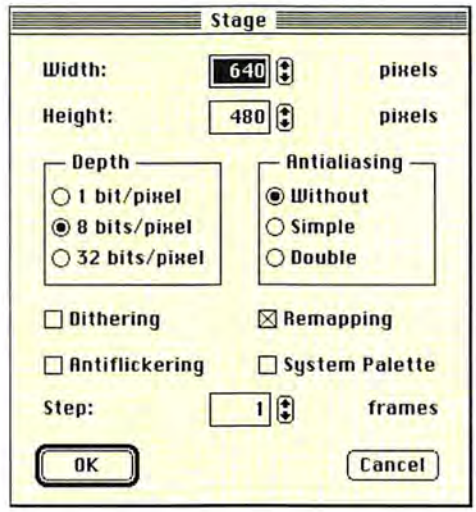
The Color module enables you to add color to animations, create animated color tables and color cycles, and perform color interpolations.

You can also use this module to manage the color palettes for various pieces of artwork in an 8-bit environment. Anyone who has ever combined multiple images into one composite, 8-bit graphic is probably familiar with the nightmare of trying to manage the resulting color palette. To relieve the problem, FilmMaker composites 8-bit animations onto a 24-bit "stage" in the Animate module; then, in rendering to 8-bit (for viewing the sequence on-screen in real time, for instance), the package automatically dithers the palettes into 8-bit and then remaps the colors so that close approximations of all the colors in the various palettes are represented in the final palette. This feature alone may make FilmMaker an animator's favorite tool.

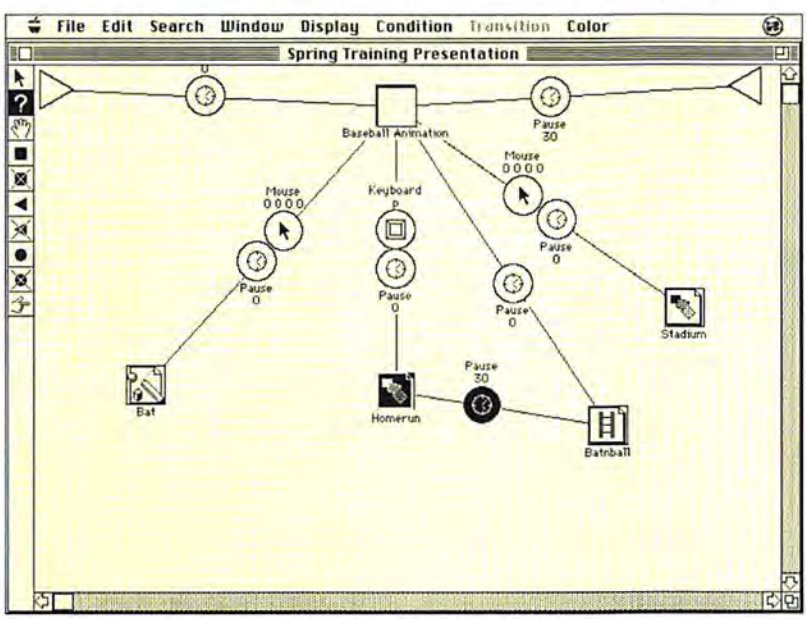
The rendered animation sequence can be played back in the Sequence Runtime module, which accelerates the file for real-time playback.

The Sound module lets you import SoundEdit audio-resource files, but you're limited to only one sound per frame or range of frames. If you want both sound effects and music to play during a specific sequence, for example, you must premix the audio in SoundEdit before importing the file into FilmMaker, which is a definite limitation in that you often have to tweak the sound once you've heard it combined with the visuals. FilmMaker will sustain a sound if the animation sequence containing it is interrupted in midplay while new information is loaded into RAM.

Present, the last module in the package, lets you combine animated FilmMaker sequences with picture files to produce fully realized presentations. A degree of interactivity can be embedded in Present's iconic script in the form of gate conditions (mouse clicks, keyboard commands, pauses), and time and transition cues can be added too.



FilmMaker offers you several options when rendering your animation. The Antiflickering option is for use with animations being exported to videotape. The Step value lets you create "draft" animations by compiling only every *n*th frame and repeating that frame *n* times so that the animation's length is maintained.



FilmMaker's Present module is an icon-based flowchart that lets you combine animations and still images into interactive presentations. The level of interactivity isn't as extensive as that of MacroMind Director, however.

The Bottom Line

FilmMaker doesn't try to do everything, but what it does, it does very well indeed. To be sure, its interface needs some improvement, and Paracomp promises refinements to the whole package in future releases (incorporating Mark into the Animate module, for instance). FilmMaker takes some getting used to — especially if you're accustomed to MacroMind Director's way of doing things. The modules tend to crash if you inadvertently try to make them do something they weren't meant to do, so the initial learning process can be frustrating. Serious animators and graphic artists, however, will see FilmMaker as a real boon to their work.

— Bill Camenga

Get Info

FilmMaker

$$$$

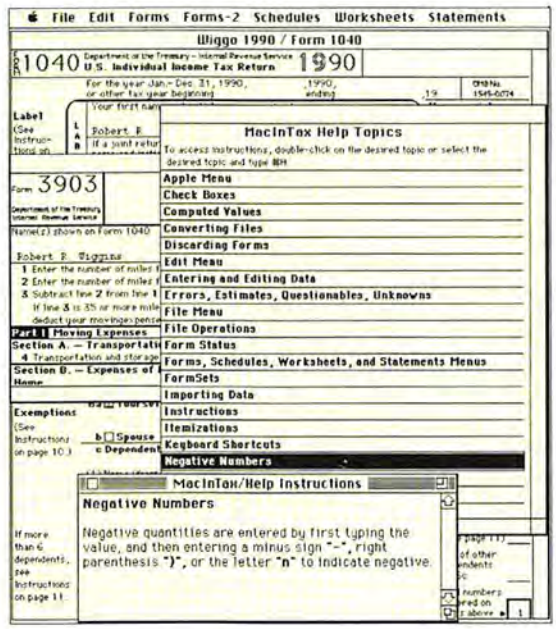
Published by: Paracomp, Inc., 1725 Montgomery Street, Second Floor, San Francisco, CA 94111; (415) 956-4091.
Version: 2.0.1.
List Price: $695.

PERSONAL FINANCE

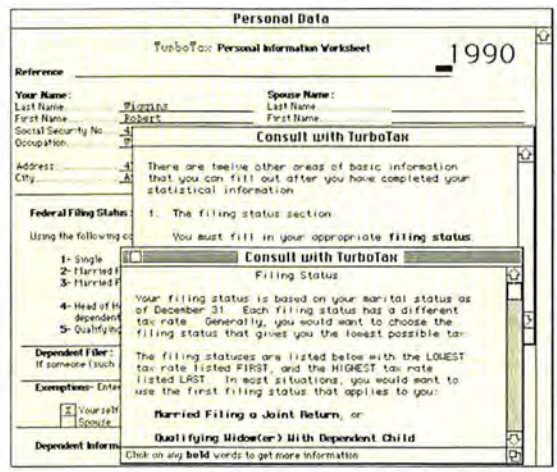
MacInTax and TurboTax

If you're still looking for an electronic tax preparer, either of these packages can fill the form.

Almost as long as there's been a Macintosh, there have been tax-preparation aids for it, and this year a DOS product, TurboTax, makes the move to the Macintosh (turnabout's fair play — the major Mac package, MacInTax, has moved to Windows). Competition usually benefits consumers, and this is no exception: Now you have two major tax-preparation packages to choose from, and both have a lot to recommend them. (This review is based on the preliminary versions of both packages, but the applications will be the same. Neither package was final, because the IRS hadn't approved all the forms by review time. The release versions should be available long before you read this.)



MacInTax is still the top Mac tax package, but it's a close race. Using MacInTax, you enter your data directly into WYSIWYG forms that are ready to be printed and mailed to the IRS. An extensive on-line help facility can answer almost any question you have.



TurboTax is a newcomer to the Mac, and its first version gives MacInTax a stiff challenge. With TurboTax, you enter some of your data into the Personal Information Worksheet. There is also a hypertextlike help facility. Note how clicking on the words *filing status* in the Consult with TurboTax window has opened another window that contains a more detailed explanation.

MacInTax

MacInTax, the first Mac tax-preparation package, originated the concept of working on actual on-screen forms that could be printed out and mailed to the IRS. Today this is a common feature in other applications, but MacInTax still does it well.

Using MacInTax is much like filling out the forms manually, with some major advantages. First, all major (and even many minor) forms and schedules are included, so you don't have to try to get copies from the IRS or go from bank to post office to bank collecting them. Second, all the forms are interlinked, so when, for example, you enter your deductions on Schedule A, the totals automatically appear in the proper place on Form 1040. Third, all the information from the IRS booklets, as well as a lot of other helpful hints and tips, is included and integrated into a useful and valuable help facility. Help is available for each line item, not just for each form, so you can usually get a detailed explanation of the particular item that confuses you just by double-clicking on the line in question.

MacInTax has many minor yet useful features. For example, you can enter estimated amounts, and the abbreviation *est* appears to the right of the dollar value. Any calculations based on estimates are notated. You can later locate estimates (as well as other missing values) by using Option-Tab or Option-Return.

In conjunction with SPEED>S Corp., Softview offers special services for electronic filing (called SPEED>FILING) and for refund-anticipation loans (SPEED>REFUND). For a fee, you can mail or fax printed copies of your return or mail a disk to SPEED>S, which will do the electronic part of the filing for you.

Softview also offers a separate tax planner, Personal Tax Analyst. And if taxes are your life, you can avail yourself of the professional versions of MacInTax, not only for 1040 forms but for Forms 1065, 1220, and 1120S as well.

TurboTax

Although TurboTax is new to the Mac, it has been a successful DOS product for some time. Possibly because of its DOS background (with its lack of WYSIWYG), TurboTax takes a different tack from that of MacInTax. For some forms, you fill out worksheets and answer questions instead of filling out the forms directly; TurboTax then fills out the forms for you.

There are, however, some forms that you do fill out (at least partially) directly.

TurboTax has several excellent features. There's an extensive hypertext help system, in which clicking on highlighted words opens up additional help windows for many levels of help. TurboTax also lets you post yourself reminder notes associated with particular line items (this feature didn't work in the Head Start version I tested, because of either a program bug or system incompatibility). It also has a Planning mode so you can look ahead to 1991 without having to purchase a separate tax planner.

TurboTax's best feature is Consult TurboTax, which is on the Assistance menu. When you select this menu item, TurboTax asks a series of yes/no questions in dialog boxes and determines which forms and schedules you need to fill out, automatically presenting them to you one at a time with instructions. When you use this option, it is almost like having an accountant.

TurboTax has other accountantlike features on the Assistance menu. Select Tax Savings, and TurboTax analyzes your return and suggest ways you might reduce your tax (you can also get general suggestions not specific to your tax return). Select IRS Audits, and TurboTax lets you know of any items on your return that could cause an audit (such as a home office). Select Data Examiner, and TurboTax determines if there is any missing information on any forms or schedules and flags any critical areas that are missing data.

The Bottom Line

MacInTax and TurboTax are both good tax-preparation applications, but MacInTax is the better *Mac* application, being more Mac-like. This is not to say that TurboTax isn't an excellent first effort at a Mac version; improved versions in the future will provide some serious competition for MacInTax.

To decide between the two programs, look at your personal situation. If you're used to MacInTax, by all means stay with it. TurboTax's different orientation may confuse you, and you may find little things about it annoying (for example, it doesn't calculate fields immediately unless you specify Autocalculate, and then it's very slow). If you're fairly experienced at doing your own taxes but this is the first time you've used your Mac to do them, MacInTax should fit your needs.

Tips for the Tax-Tardy

If you're reading this with an eye toward picking a tax-preparation package, you're already running out of time. There's good news and bad news for last-minute taxpayers. The good news is that you can get an automatic four-month filing-deadline extension by filing Form 4868 before April 15. The bad news is that the extension is only for *filing*, not *paying*. You have to pay all your taxes by April 15 (you send in a payment with Form 4868 if necessary). Tax software can still help, however.

The first thing you need to do when you open your tax-software package is send in the registration card so you can get the final version sent to you free of charge. Although both MacInTax and TurboTax's final versions were supposed to be ready by February, many of the older versions remain in stores long after the new versions are available, so send in your registration card no matter when you bought your software. The IRS won't accept old software as an excuse. This is especially important in the case of MacInTax, because Form 4868 is one of the forms missing from the preliminary version.

Once you're registered, you can go ahead and use the package you have to make your best estimate of what you will owe. After you have calculated your estimated tax, you can fill out Form 4868 and send it in with your check (if your estimate is higher than what you've already paid in).

If you're using MacInTax and your final version hasn't arrived in time, you can either use a paper Form 4868 (available at many banks and post offices) or download Form 4868 from SoftView's support section on CompuServe (MACAVEN Library 17) or GEnie. TurboTax users can find Form 4868 in both the Head Start and final versions of the product.

If you do file for an extension, remember that you won't get much sympathy when you run around complaining about taxes right before August 15. For maximum sympathy, you have to complain by April 15. There's no extension on time for complaining.

TurboTax might be the better choice for a variety of reasons: If you need a lot of help, you may find the Consult TurboTax option useful; if you want to do some tax planning for 1991, TurboTax's built-in Planning mode can save you some money; and if you're a Quicken user, TurboTax's interface with Quicken makes it the logical choice.

If you live in California, Illinois, Massachusetts, Maryland, Michigan, New Jersey, New York, Ohio, or Virginia, you can choose either program, as both have state-tax versions. If you live in North Carolina, only TurboTax has a state-tax version. If you live in Washington, D.C.; Connecticut; Minnesota; or Pennsylvania; MacInTax has the only state versions. Residents of all other states can choose either program but will have to do their state taxes the old-fashioned way. MacInTax's state-tax versions cost $69 each; TurboTax's are $49 each.

You really can't go wrong picking either program. Both offer free upgrades to the final version, extended support hours during tax season, on-line support on CompuServe and GEnie, and reduced rates for next year's versions.

If you already have an accountant you're comfortable with, there's really no reason to switch to a software tax preparer. After all, no program — no matter how well written it is — can replace a knowledgeable human being. On the other hand, if you don't have an accountant, or if you're brave enough to want to assume direct control of your finances, good tax software is essential, and either of these two programs would be an excellent choice.

— Robert R. Wiggins

Get Info

MacInTax 1990

★★★★½

Published by: Softview, Inc., 1721 Pacific Avenue, Suite 100, Oxnard, CA 93033; (805) 385-5000.
Version: 1.4.
List Price: $99; state-tax versions, $69 each.

TurboTax

★★★★

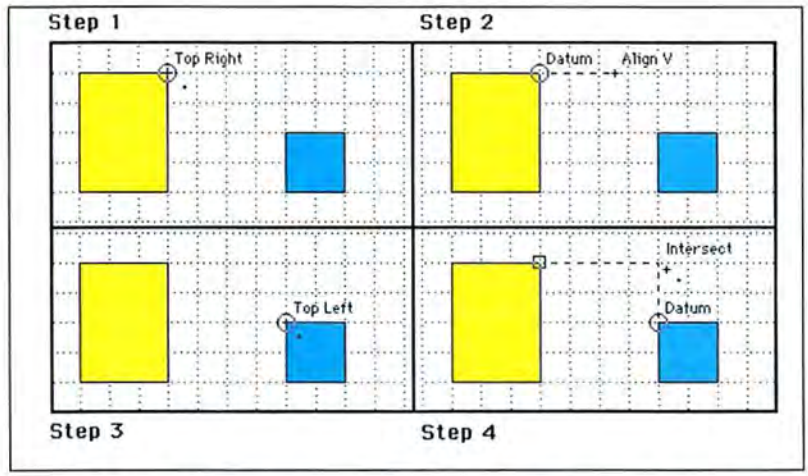
Published by: ChipSoft, Inc., P.O. Box 85709, San Diego, CA 92186; (800) 755-8829.
Version: 1.0.
List Price: $89; state-tax versions, $49 each.

CAD

MiniCad+ 3.0

This Eddy-award-winning CAD package is tops in features and value.

With Claris CAD and Ashlar Vellum posing serious challenges, Graphsoft has responded with a completely rewritten MiniCad+, version 3.0, that raises the stakes even higher. While retaining the extensive feature set of the previous version, Graphsoft has enhanced the program, extended its power, and given it a more refined and coherent feel, thus making it easier to use.



MiniCad+ 3.0 has added an "intelligent cursor" function that's similar to the smart cursors in Vellum and Claris CAD. In this sequence, you can see how the screen hints update to reflect the cursor's changing relationships relative to its previous position.

Intelligence and Programming

As soon as you start to edit a document, you notice a difference from version 2.0. The Smart Cursor with Screen Hints automatically highlights and identifies relevant drawing snaps, intersections, tangents, and other constraint criteria. This feature speeds up drawing and placement operations considerably and makes it easier to maneuver around within the document. For most CAD users, this option alone will justify the upgrade to version 3.0.

Version 2.0 introduced MiniPascal as MiniCad+'s macro-programming language, but the only way to create a MiniPascal command file was through a text editor. MiniCad+ 3.0 adds a series of dialog boxes that you can use to create macros. Although this isn't nearly as developed as the same sort of facilities in dedicated database applications such as FileMaker Pro or 4th Dimension, it is a step in the right direction for those who want to create custom commands but shy away from the notion of programming. You can also use these dialog boxes to create custom drawing tools.

MiniCad+ 3.0 makes it seem as if anything you can do in the Drawing mode, you can also accomplish with a preprogrammed command. Because MiniPascal supports the Macintosh interface by allowing the definition of dialog boxes, alteration of application menus, monitoring of events, and access to the spreadsheet facility, MiniPascal should be considered a full-blown development environment, optimized for CAD and analysis, residing inside MiniCad.

The third major new feature, the Data Palette Relational Database, is an extension of version 2.0's facilities. Although the manual uses the term *relational* to describe the Data Palette, this is slightly misleading. A better explanation is that the Data Palette, which is a floating windoid, links typed-in data (class designation, manufacturer, and pricing, for example) to drawn elements and provides you with ways to view and analyze your graphic objects.

By using the MiniCad Worksheet (linked spreadsheet facility), you can select different classes of objects and combine them to form relationships that can be used in calculations via MiniPascal's and the Worksheet's access to the Data Palette information. This isn't quite 4th Dimension, but using the Data Palette and the Worksheet together can let you dispense with the need for a separate file-management application for costing and model information.

MiniCad+ 3.0 sports a completely redone manual that's divided into three sections: a tutorial of more than 80 pages, a MiniCad user guide (with reference), and a MiniPascal language manual that is as long as the entire MiniCad reference. The tutorial is a welcome addition, and it does a good job of introducing some of MiniCad+'s new features. Unfortunately, some important features, such as command creation and usage, are missing. Graphsoft sells a HyperCard-based tutorial that extends the tutorial booklet.

Since MiniCad is an ever-developing product with a rapid rate of new-feature introduction, the documentation lags a step behind in some spots. Some features are not explained in depth within the user/reference guide, leaving users to their own devices to figure some things out. Luckily, Graphsoft's support people fill in the gaps.

The Bottom Line

Thanks to MiniCad+ 3.0's enhancements, the program keeps its place as the Mac power-CAD bargain — even considering its competition. The new features don't slow the program down or make it more difficult to use. In many ways, MiniCad+ 3.0 is still a sleeper: a fast 2-D/3-D CAD program with an exhaustive feature set, analysis tools unsurpassed in its price range, and a close adherence to the Mac way of doing things. Even allowing that Claris CAD may still have a slightly smoother interface, MiniCad+ 3.0's extended capabilities make it too good to ignore.

— Peter Mengaziol

Get Info

MiniCad+ 3.0

★★★★½

Published by: Graphsoft, Inc., 8370 Court Avenue, Suite 202, Ellicott City, MD 21043; (301) 461-9488.
Version: 3.0.
List Price: $795.



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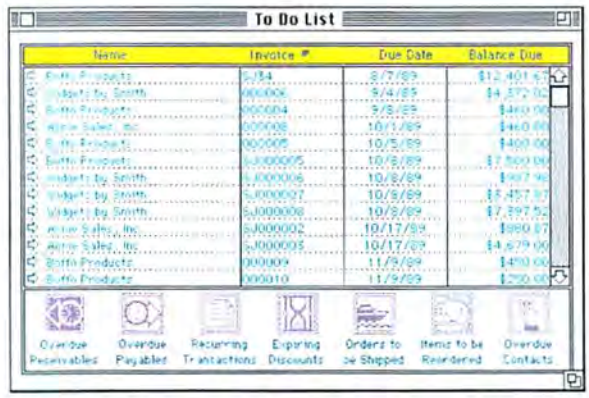
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BUSINESS ACCOUNTING

M.Y.O.B.

Teleware's budget accounting system is an excellent choice for small businesses.



M.Y.O.B. is a solid accounting package for small companies that don't have the resources for a full-time accounting department. M.Y.O.B.'s to-do list has always been a strong point, and the new version's is even better.

In the last two years, M.Y.O.B. has received two Eddy-award nominations. As accounting programs go, it packs more punch per dollar than almost any other system on the market. What makes the program different is that it combines the functionality experienced accountants expect with the ease of use that novices demand. M.Y.O.B. is a solid, double-entry accounting system that can work in any small business. However, it can't handle multiple companies or departments, so its usefulness as a write-up tool for an accounting practice is limited.

Almost All in One

M.Y.O.B. consists of fully integrated accounts-payable, accounts-receivable, general-ledger, and inventory modules. It still doesn't include an integrated payroll system, which limits its usefulness, but many small businesses opt for private payroll services anyway.

M.Y.O.B. incorporates a unique filing concept called Card File that acts like an electronic Rolodex for important business information. If you want to get fancy, you can use a modem as an auto-dialer to make telephone calls from Card File. It combines this feature with a full accounting history for each card, so you can use the package as a sales tool to keep track of your customers' orders.

M.Y.O.B.'s inventory system isn't terribly sophisticated, but it is sufficient for time-and-material shops that keep small inventories and use straightforward valuation methods.

To keep the accounting system simple, M.Y.O.B. uses a five-digit account number that some large businesses may find problematic. Another accommodation to small-business owners is a function that keeps fiscal periods open indefinitely. Although many professional accountants froth at the mouth at the thought of this open-endedness, M.Y.O.B.'s approach lets the program be used as more than an accounting tool. Teleware recognizes that a small business's accounting system is more than just its books; it's that company's entire management-information system — and the more information easily available, the better.

M.Y.O.B's high-end features are accounts-receivable credit warnings, partial payments, invoicing and statements, accounts-payable partial payments using the open-invoice method, automatic late charges and discounts, and budgeting comparing prior year with current year.

New and Better

Version 2.0's new features round out some of the first release's rough spots. Enhancements include custom form printing, an auto-build inventory, an expanded to-do list, new reports, a hand-written option, and an improved command center.

Its custom form-printing system is highly flexible and lets you change the look and content of printed checks, invoices, statements, purchase orders, and mailing labels to give them a unique look and feel.

The auto-build inventory feature keeps track of what parts you use when building an item. When you record completion of a manufactured product, M.Y.O.B. automatically debits all your inventory accounts for the parts used in the manufacturing process and makes all the necessary accounting entries to account for the cost of the parts. Unfortunately, you still have to record spoilage manually.

The program's to-do list has always been one of its most attractive features. The list automatically alerts you about overdue receivables, overdue payables, discounts about to expire, and so on. The expanded to-do list shows a listing of all receivables with overdue items marked with an asterisk. The same holds true for payables, inventory, purchases, and sales.

M.Y.O.B.'s report repertoire has always been well rounded. In addition to the standard accounting reports such as income statement and balance sheet, M.Y.O.B. now produces customer sales details based on a date range; invoice summaries by date range; purchases by date range; pending sales items; a job-inquiry report; and reports by user-specified identifier, such as account types and geography.

The command center, M.Y.O.B.'s navigation system, stays on-screen and remembers where it was placed even when you exit from M.Y.O.B. under MultiFinder. This new feature again demonstrates Teleware's understanding of small businesses: You can enter and exit gracefully as you use your Mac for other daily business tasks, whereas most accounting systems tie up your Mac.

The Bottom Line

M.Y.O.B's main competition is still Insight's atOnce!. atOnce! has the payroll edge over M.Y.O.B., but M.Y.O.B offers inventory control to atOnce!'s manual system. What was once a clear win-and-show horse race with atOnce! in the lead is now a photo finish. The winner depends on which module you bet you can live without. If it's payroll, M.Y.O.B. is the sure winner.

— Ken Landis

Get Info

M.Y.O.B.
★★★★½
Published by: Teleware, Inc., 22 Hill Road, Parsippany, NJ 07054; (201) 334-1154.
Version: 2.0.
List Price: $249.

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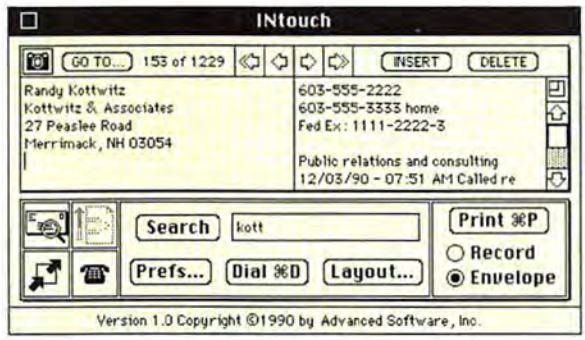
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PERSONAL INFO MANAGERS

Intouch

A worthy successor to QuickDex at last



Intouch is a personal database program that challenges QuickDex as the best in the field. The program's entire interface is contained in this window. You can search for anything, dial the phone, address an envelope, or take notes.

The first great Mac name-and-address keeper was QuickDex, a small, blazingly fast, free-form database program. Since QuickDex's debut three years ago, we've seen a few good envelope printers with address-book facilities built in (Easy Envelopes, Kiwi Envelopes, and FastEnvelopes), and some excellent address-book programs (DynoDex, AddressBook Plus, MacPhoneBook). We haven't, however, seen the blazingly fast name-and-address keeper that would improve on QuickDex.

The Challenger

The DA Intouch, from Advanced Software (its other product is DocuComp), competes directly with QuickDex. It gives away a little in speed but adds a lot in features. Unlike address-book programs with their multiplicity of fields, Intouch has only two data fields per record — a name-and-address field and a notes field in which you store phone numbers and anything else you wish. The notes field can hold up to 32K of information.

Printing abilities are built in. The search-for box is also always available. Just type in your request, and press Return. In fact, the search-string box is one of the three fields to which tabbing through a record takes you (address, then notes, then search).

You enter data into the two data fields separately. Intouch uses the entire first field, exactly as you've entered it, for printing envelopes and labels. The arrangement of data in the second field is up to you. Searches, which are very fast, look through everything in the data fields and find things no matter where you've tucked them.

The Snapshot button is a nice feature. It either copies the current address field into the Clipboard or pastes the contents of the Clipboard into the address field if that field is blank. The notes field can be zoomed to take up the whole active window; doing so produces a time-and-date-stamp button at the bottom of the window.

The search functions opt for speed over complexity. You enter a simple ASCII string, and that's what you search for: no multiple criteria, no Booleans. The Dial button dials the first number in the notes field. If you want to dial another number, you must place the cursor directly before it.

Intouch's printing capabilities are numerous. You can build custom layouts for envelopes or arrangements of labels as well as use the built-in selection of basic envelope and label layouts. Bar codes and FIMs (facing identification marks) can be generated on envelopes (except on DeskWriter printers, where the smaller active print area doesn't allow room for bar codes). Return addresses can have graphics embedded, and the program can store up to ten different return addresses. The printing can be in any typeface and size that fits. You can add messages to the lower left corner of envelopes. Finally, the Print Preview button gives you a look at what you're about to print.

A Challenge Well Met

Intouch works very well. With more than a thousand records in my file, some with extensive note fields, performance is more than adequate. It's not as fast as QuickDex, but it's not so slow as to make me long for QuickDex. The interface is attractive and intuitive.

The phone-dialing capabilities of Intouch are more than adequate. All the features users have come to expect are there: automatic prefixes and suffixes, skipping of area codes for local calls, special dialing-command strings, and the ability to use either the speaker or a modem.

Intouch can import QuickDex and tab-delimited ASCII-text files. It handled my large, messy QuickDex file quickly and well, requiring minimal cleanup after the import. Exporting options are much broader, with 19 formats built in. The export formats cover tab-delimited ASCII and those of all the major database programs and word processors — yes, Word, Excel, and 4D are there. You're sure to find something useful in the list. You can export just names and addresses or entire records.

The two major drawbacks are the size of the working window, which is on the small side and fixed, and the 9-point type used in the window. I'd really appreciate a resizable window and the ability to select a different typeface and size for display.

The navigational controls above the address and notes fields take up too much space, especially as they're not very useful. Records are not sorted into any particular order (they're kept in the order entered), so there's usually no reason to scroll through a big file, record by record.

The Bottom Line

Intouch is currently the best pure name-and-address keeper for the Mac. It isn't an address-book printer but a screen program with good one-shot printing ability. Searching is fast, data entry is simple, and it has no glaring flaws or bugs. I use it for names and phone numbers and, thanks to the free-form notes field and time-stamp button, as a contact history. Other users will find it helpful for doing simple project-tracking chores.

In a crowded market, the simplicity and power of Intouch make it stand out. It's a worthy successor to the old QuickDex 1.4.

— Steven Bobker

Get Info

Intouch

★★★★½

Published by: Advanced Software, Suite 103, 1095 E. Duane Avenue, Sunnyvale, CA 94086; (408) 733-0735.
Version: 1.0.
List Price: $79.95.



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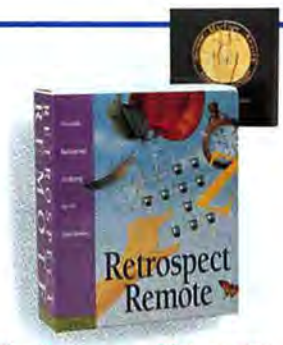


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3639 WriteNow 2.2A/Grammatik Mac . . 117.
8206 SmartBundle 215.
★WordPerfect ... 60 day MBG
3800 WordPerfect Mac 2.0 279.

GRAPHICS & DESIGN

★Abbott Systems ... 30 day MBG
8052 Cheshire 1.0 63.
Eddy H.M. - Best Utility
Adobe Systems
Adobe Type Library *(Vol. 1-184)* . . . call
6957 Adobe Type Reunion 1.0 38.
5750 Adobe Type Manager 2.0 55.
8794 Adobe Type On Call 59.
6053 Adobe Plus Pack 109.
6156 Adobe Plus Pack/ATM 159.
6098 TypeAlign for ATM 1.0.4 59.
6985 Adobe ATM/TypeAlign Pack 89.
Adobe Type Set 1, 2 or 3 call
8042 Adobe Type Sets 1-2-3 Bundle . . . 199.
8171 Adobe Illustrator 3.0 *(w/ATM)* 349.
Eddy H.M. - Best Graphics Program
6644 Adobe Photoshop 1.07 499.
Eddy - Software Product of the Year
5001 StreamLine 2.0 125.
Smart Art I, II, III, or IV *ea.* 59.



Dantz Development ... 30 day MBG
7945 Retrospect Remote 1.2–Honorable Mention– 1990 MacUser Editors' Choice Award for *Best Connectivity Software.* Provides automatic, unattended workgroup backup using AppleTalk network. Supports tape, optical, & cartridge drives **$265.**

★Aldus/Silicon Beach ... 30 day MBG
6674 Personal Press 1.0 199.
3506 SuperPaint 2.0A 135.
8811 SuperPaint/Personal Press Bundle 279.
3980 Digital Darkroom 2.0 259.
3507 Super3D 2.1 279.
Persuasion, PrePrint or FreeHand *ea.* 329.
7088 PageMaker 4.0 499.
8054 Design Team *(PM, FH & PrePrint)* . 889.
Altsys
5425 Art Importer 2.0 89.
6499 Metamorphosis 1.5 89.
1195 Fontographer 3.2 265.
Eddy H.M. - Best Typographic Product
★Ares Software ... 30 day MBG
8878 FontMonger 1.0 63.
★Baseline Publishing ... 30 day MBG
7784 Color MacCheese 1.05 57.



Innovative Data Design
4707 Dreams 1.1–Advanced, yet easy-to-use precision drawing and design software. Features include parallel line tool, glue and unglue, add and subtract, trim and fillet tools, true associative dimensioning and more **$349.**

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8767 Multi-Ad Creator 2.5–It's all here: Power, speed, precision, color separations. The high-end choice for producing complex pages–*fast*. *MacUser* says "If you create ads, get it." . $695.

Bright Star Technology
6093 interFACE 1.0 249.
Eddy H.M. - Best Animation Program
Broderbund Software
1427 The Print Shop 1.3.2 35.
6281 TypeStyler 1.5.2. 115.
Eddy - Best Typographic Product
★Casady & Greene ... 60 day MBG
8879 Fluent Font Library 4.0 105.
Claris
1123 MacPaint II 2.0 92.
1117 MacDraw II 1.1V2 289.
8007 Claris CAD 2.0 649.
★Creative Software ... 30 day MBG
6645 Easy Color Paint 2.0 45.
★Custom Applications ... 30 day MBG
8037 Freedom of Press Light 3.0 *(17 fonts)* 56.
6517 Freedom of Press 3.0 255.
★DeltaPoint ... 60 day MBG
6095 DeltaGraph 1.5 109.
★Deneba Software ... 30 day MBG
6365 UltraPaint 1.01 125.
1769 Canvas 2.1.1 189.
★Dream Maker ... 30 day MBG
Cliptures: Business or Sports . . *ea.* 69.



Baseline Publishing ... 30 day MBG
8881 *Thunder 7*–A truly interactive spelling & thesaurus program for all applications . $57.
7783 *INIT Manager*–Locate, manage & analyze all your start-up documents 35.
8882 *1 Shot Worksheet*–A powerful spreadsheet combined with a forms generator. 57.

★Electronic Arts ... 30 day MBG
4315 Studio/8 2.0. $189.
8056 Studio/32 1.0 449.
Eddy - Best Graphics Program
★Farallon Computing ... 30 day MBG
6770 MacRecorder Voice Digitizer. 89.
2199 MacRecorder Sound System 2.02 159.
★Foundation Publishing ... 60 day MBG
6728 Comic Strip Factory 1.6 37.
Frame Technology
7505 FrameMaker 2.1 for the Mac. 795.
Eddy H.M. - Best Page Design Program
Innovative Data Design
2417 MacDraft 2.1. 279.
4707 Dreams 1.1. 349.
Letraset
2619 ImageStudio 1.5 139.
2621 Ready Set Go! 4.5A 165.
6300 FontStudio 1.0 359.
Eddy H.M. - Best Typographic Product
6301 ColorStudio 1.1 649.
Eddy - Best Color Prepress Product
★Linguist's Software ... 60 day MBG
Over 100 language fonts. call



Zedcor ... 60 day MBG
3986 *DeskPaint & DeskDraw 3.03*–*Honorable Mention*–1990 MacUser Editors' Choice Award for *Best Graphics Program*. Great graphics desk accessories. Supports B&W, gray-scale, or color. Compatible with system 6.04 or better . $115.

★Loop Software ... 30 day MBG
8726 OverView 1.0 89.
★MacroMind ... 30 day MBG
5087 MacroMind Director 2.0 439.
Eddy H.M. - Best Multimedia Software
★Mainstay ... 30 day MBG
7714 Capture 3.0 45.
★MediaLab Tech. ... 30 day MBG
8218 Picture Link 1.1. 225.
★MicroFrontier ... 30 day MBG
7886 ENHANCE 1.2 239.
★MicroMaps ... 30 day MBG
7554 MapArt *(Paint)*. 41.
MapArt *(EPS)* or MapArt *(PICT)* *ea.* 99.
★Microsoft ... 30 day MBG
2878 PowerPoint 2.01 245.
Multi-Ad Services
8767 Multi-Ad Creator 2.5 695.
PANTONE
7466 Process Color Imaging Guide. 49.
Paracomp
7728 SwivelArt 1.0. 82.
7441 Swivel 3D Professional 1.0 439.
8957 Swivel Pro/MacRenderMan Bundle 949.



Paracomp
7839 *FilmMaker 1.0*–1990 MacUser Editors' Choice Award for *Best Animation Program*. The ultimate animation & multimedia graphics program. Quickly create professional quality presentations & animations with ease . . $439.

7839 FilmMaker 1.0. 439.
Eddy - Best Animation Program
Pixar
8965 Pixar Showplace 1.0 469.
8966 MacRenderMan 549.
Eddy H.M. - Best 3D Modeling/Rendering
★Preferred Publishers ... 30 day MBG
8055 Screenshot 1.2 31.
8872 MasterPaint 1.0. 51.
7828 Exposure Pro 1.1 69.
Quark
7612 Quark XPress 3.0 519.
★Solutions, Inc. ... 60 day MBG
3446 The Curator 1.05 87.
★Springboard ... 30 day MBG
3530 Certificate Maker 2.02. 22.
Strata
7773 Stratavision 3D 1.5.5. 369.
Eddy H.M. - Best 3D Modeling/Rendering
7772 Stratavision 3D/Renderman Bundle 999.
Strategic Mapping
6518 ATLAS•MapMaker 4.5 369.
★SuperMac Tech. ... 60 day MBG
3380 PixelPaint 2.1 149.
5625 PixelPaint Professional 2.0 465.
★Symmetry ... 30 day MBG
8172 Mariah 1.0 94.
★Tactic Software ... 30 day MBG
8251 Icon It! 2.1 45.
Magic Typist, Art Fonts, Sound Clips or Art Clips 1 *ea.* 50.
8261 Art Clips 2. 65.
8248 Font Share 2.2 129.
3G Graphics
3942 Images with Impact: Graphics 1 . . . 50.
4583 Images with Imapct: Business 1 . . . 65.
6379 Accents & Borders I 65.
Eddy - Best Data Resource
★Timeworks ... 30 day MBG
7115 Publish It! *Easy* 2.0 145.
Eddy - Best Design Program
Ventura Software
8962 Ventura Publisher 3.0 499.
★Wildflower ... 30 day MBG
6512 SnapJot 3.0 32.
★Zedcor ... 60 day MBG
3986 DeskPaint & DeskDraw 3.03 115.
Eddy H.M. - Best Graphics Program

to earn the name Ed.



Adobe Systems
6644 *Adobe Photoshop 1.07*–1990 MacUser Editors' Choice Award for *Software Product of the Year*. A photo-editing and production tool. Produce halftones, adjust brightness and contrast, even colorize them. $499.

PROGRAMMING & UTILITIES

★Abbott Systems ... 30 day MBG
5236 CanOpener 1.1 63.
★Advanced Software ... 30 day MBG
8051 In touch 1.0 40.
★Affinity Microsystems ... 60 day MBG
7835 Tempo II Plus 105.
★Aladdin Systems ... 30 day MBG
6169 Shortcut 1.0.1 46.
6740 StuffIt Deluxe 2.0 63.
★Aldus/Silicon Beach ... 30 day MBG
5100 SuperCard 1.5 199.
★ASD Software ... 30 day MBG
7085 FileGuard Extended 2.5.2 *(1 user)*. 139.
7422 FileGuard Extended 2.5.2 *(5 user)* 349.
7423 FileGuard Extended 2.5.2 *(10 user)* 579.
★Baseline Publishing ... 30 day MBG
7783 INIT Manager 35.
★Berkeley Systems ... 30 day MBG
5737 After Dark 2.0T 22.
1541 Stepping Out II 2.02 49.
★Casady & Greene ... 60 day MBG
2269 QuickDEX 1.4D 34.
7443 A.M.E. 1.1.2 159.
★CE Software ... 60 day MBG
4689 MockPackage Plus Utilities 4.4 31.
1727 CalendarMaker 3.0 31.
6278 DiskTop 4.0 63.
7518 Alarming Events 1.01 85.
8024 QuicKeys^2 2.0.1 94.
★Central Point ... 30 day MBG
5040 Copy II Mac 7.2 25.
5041 Mac Tools Deluxe 1.0 79.
★Connectix ... 30 day MBG
7830 Maxima 1.0 45.
6123 Virtual 2.04 *(for SE/30, IIcx, IIx, & IIci)* 115.
6122 Virtual 2.02 *(for Mac II, incl. PMMU)* 188.
6647 HandOff II 1.1.3 57.
Eddy H.M. - Best Utility

★Dantz Development ... 30 day MBG
5255 Retrospect 1.2 $148.
7945 Retrospect Remote 1.2 265.
Eddy H.M. - Best Connectivity Software
7946 Remote *(10 Pack of inits)* 148.
★Design Science ... 30 day MBG
7887 MathType 2.0 89.
★Digitalk ... 60 day MBG
5166 SmallTalk/V Mac 1.1 124.
Dubl-Click Software
7974 ClickChange 1.04 41.
1824 Calculator Construction Set 2.09.6 . 45.
★Fifth Generation ... 30 day MBG
4287 PYRO! 4.0 25.
3955 Suitcase II 1.2.6 49.
FastBack II 2.5 or DiskLock 2.0 . . . 118.
8284 SuperSpool 5.0 62.
8286 SuperLaserSpool 2.02 93.
ICOM Simulations
4084 On Cue 1.3 35.
4085 TMON 2.8.4 86.



Penton Overseas ... 30 day MBG
VocabuLearn/ce–Building blocks of language. New version features: type answers, user modifiable options, create personal data stacks, keep statistics, and more. 3 hours of sound. Includes free HyperCard 2.0 . . **see line listing.**

★Insight Development ... 30 day MBG
6171 MacPrint 1.23 94.
★JAM Software ... 30 day MBG
6089 Smart Alarms 3.0 w/Appt. Diary 3.1 63.
6088 Smart Alarms 3.0 *(1-4 users)* 125.
★Kent Marsh Ltd. ... 30 day MBG
5457 QuickLock 2.0 34.
2591 The NightWatch 1.03 85.
6134 MacSafe II 107.
★Kiwi Software ... 60 day MBG
6267 KiwiEnvelopes! 3.1 33.
★Loop Software ... 30 day MBG
5442 PictureBook 3.2 39.
★Magic Software ... 30 day MBG
7267 AutoSave II 2.0 27.
7270 Backmatic 2.0 50.
★Microcom ... 30 day MBG
8562 Complete Undelete 48.
4803 Virex 3.0 57.
8561 911 Utilities 89.



JAM Software ... 30 day MBG
6089 *Smart Alarms 3.0 with Appointment Diary 3.1*–A Macintosh reminder and calendar system featuring: auto backup, variable snooze, multiple reminders, weekly and monthly views, and zoom. Multiple users available **$63.**

★Microseeds Pub. ... 60 day MBG
7068 INITPicker 2.0 35.
Redux 1.63 or Rival 1.1.4 *ea.* 49.
★Microsoft ... 30 day MBG
4471 QuickBasic 1.0 64.
★Millenium Software ... 30 day MBG
6105 HyperX 4.0 99.
Multi-Ad Services
8850 Multi-Ad Search 1.0 129.
★Now Software ... 30 day MBG
6925 Now Utilities 2.0 75.
6739 Prototyper 3.0 184.
Olduvai
4503 MultiClip 2.0 72.
★ON Technology ... 1 year MBG
6385 On Location 1.02 75.
★Palomar Software ... 30 day MBG
8210 Plottergeist 1.1 199.



ASD Software ... 30 day MBG
7085 *FileGuard Extended 2.5.2*–Protect your hard drives, applications, files/folders (including system folder) from unauthorized access, deletion, and/or illegal copying. Now with system usage audit trail. 5 & 10 user also available **$139.**

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★**Salient Software ... 30 day MBG**
7404 DiskDoubler 3.1 45.
Eddy H.M. - Best Compression Product
★**Solutions, Inc. ... 60 day MBG**
3448 SmartScrap & The Clipper 2.1 56.
3449 SuperGlue II 2.01 75.
★**SuperMac Tech. ... 60 day MBG**
3377 DiskFit 2.0 58.
★**Symantec ... 30 day MBG**
5176 Symantec AntiVirus for Mac *(SAM)* . 65.
5724 Symantec Utilities for Mac *(SUM II)* . 96.
6748 Norton Utilities for the Mac 1.0 84.
Eddy - Best Utility
3421 THINK Pascal 3.0 165.
Eddy - Best Development Tool
3420 THINK C 4.0 165.
★**Synex ... 30 day MBG**
7147 MacEnvelope 5.02 57.
★**Systems Compatibility ... 30 day MBG**
7872 Software Bridge 1.0 79.

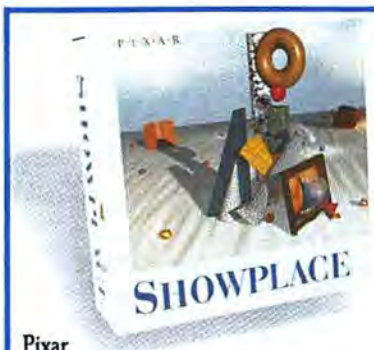


Timeworks ... 30 day MBG
7115 *Publish It! Easy 2.0*–1990 MacUser Editors' Choice Award for *Best Page Design Program.* "Its combination of word processing, graphics, and page-layout capabilities work speedily on any Mac." $145.

★**Tactic Software ... 30 day MBG**
8964 MasterFinder 1.0 50.
★**Teletypesetting ... 30 day MBG**
8601 TScript Basic 54.
8058 TScript 1.3 92.
★**TGS Systems ... 60 day MBG**
6667 Prograph 2.0 Compiler Version . . . 245.
★**Williams & Macias ... 30 day MBG**
3781 LaserWriter Label Pack *(Qty. 216)* . . 18.
6926 myDiskLabeler III 3.0 42.
4976 StickyBusiness 1.4 51.
Wolfram Research
8273 Mathematica Enhanced 1.2 699.
★**Zedcor ... 60 day MBG**
3985 ZBasic 5.0 99.

CD-ROM

Activision
8125 Cosmic Osmo *(CD-ROM)* 46.
Eddy - Best Recreation Program
CD Technology
8057 CD-ROM Porta Drive 649.
7686 Porta Drive & MS Office CD-ROM . 999.
Chinon
8813 CDA-431 CD-ROM Drive. 639.



Pixar
8965 *Pixar Showplace 1.0*–Complete picture-making tool. Alter conditions to achieve any scene you wish. Automatically processes your scene into a full-color picture. Imports into other presentation/desktop publishing applications . . . $469.

★**Farallon Computing ... 30 day MBG**
6767 MediaTracks Multimedia CD Pack . 319.
★**Highlighted Data ... 30 day MBG**
7771 Webster's Dictionary *(CD-ROM)* . . 159.
★**HyperGlot ... 30 day MBG**
7473 Learn to Speak French *(CD-ROM)* . 159.
7829 Learn to Speak Spanish *(CD-ROM)* 159.
★**MacroMind ... 30 day MBG**
7712 MacroMind CD-ROM 125.
★**Microsoft ... 30 day MBG**
6382 The Microsoft Office *(CD-ROM)* . . . 599.
Multi-Ad Services
ProArt Trilogy *(CD-ROM series)* *ea.* 259.
NEC
Image Gallery, Type Gallery PS, Photo Gallery or Clip-Art 3D *ea.* 246.
6744 CDR35 CD-ROM Portable Drive . . 349.
6743 Mac Driver Kit. 64.
Passport Designs
8255 Desktop Music Creativity *(CD-ROM)* 189.
8607 Music Production Kit *(CD-ROM)* . 1259.
★**Somak Software ... 30 day MBG**
LaserArt CD-ROM Vol. 1 or 2 . . *ea.* 62.
Toshiba
6749 XM 3201 CD-ROM Drive. 779.



Microcom ... 30 day MBG
4803 *Virex 3.0*–Comprehensive solution to the threat of computer viruses $56.
8561 *911 Utilities*–Troubleshooting, file/disk recovery, complete undelete, isolate bad sectors, & Virex. 89.
8562 *Complete Undelete*–Recovers deleted files 48.

EDUCATION & RECREATION

Accolade
Stratego or Balance of the Planet *ea.* 29.
8217 Ishido: The Way of the Stones 32.
8220 Jack Nicklaus Greatest 18. 34.
Activision
4486 Manhole. 28.
★**Aldus/Silicon Beach ... 30 day MBG**
Dark Castle or Beyond Dark Castle *ea.* 32.
★**Ars Nova ... 30 day MBG**
1215 Practica Musica 2.2 69.
★**Baseline Publishing ... 30 day MBG**
7785 Talking Moose 23.
★**Beacon Technology ... 30 day MBG**
Gems of The Word *(KJ or NI)* . . *ea.* 25.
HyperBible 2.0 *(KJ or NI)* *ea.* 125.
★**Bogas Productions ... 60 day MBG**
6135 Super Studio Session w/Music Library 99.
Bright Star Technology
1402 Alphabet Blocks 1.0 30.



Electronic Arts ... 30 day MBG
8056 *Studio/32 1.0*–1990 MacUser Editors' Choice Award for *Best Graphics Program.* The professional's tool for all aspects of design. $449.
4315 *Studio/8 2.0*–Now packed with more features and lower in price! 189.

Broderbund Software
4314 Type! 1.0. 18.
6516 The Playroom 1.1 *(CP)* 29.
Eddy H.M. - Best Recreation Program
Carmen Sandiego Series *(CP)* . . *ea.* 29.
8266 SimEarth 1.0. 40.
4966 SimCity 1.2 *(CP)* 29.
5871 SimCity Supreme 1.2C 47.
Geom., Physics, or Calc. *(CP)* . *ea.* 58.
Bullseye
4074 P51 Mustang *(CP)*. 36.
Carina Software
5726 Voyager 1.2 88.
★**Casady & Greene ... 60 day MBG**
2268 Crystal Quest 2.2 29.
Mission Starlight or Sky Shadow *ea.* 29.
Centron Software
8525 Casino Master *(B&W)* 41.
8524 Casino Master *(Color)* 45.
Coda Music Systems
8188 MusicProse 2.0. 299.
5604 Finale 2.5 549.
Davidson & Associates
1734 Math Blaster! 1.0 *(CP)*. 29.
6128 Math Blaster Mystery *(CP)*. 29.
8278 Alge-Blaster Plus 35.

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Custom Applications ... 30 day MBG

6517 *Freedom of Press 3.0*–Brings PostScript printing capabilities to non-PostScript, black and white devices. New features include Adobe Type 1 support and compatibility with all Macs . **$255.**

8037 *Freedom of Press Light 3.0* (17 fonts) **56.**

★EARTHQUEST ... 30 day MBG

8050 EARTHQUEST 1.0 48.

★Electronic Arts ... 30 day MBG

6716 Pipe Dreams 1.0 17.

8643 Harpoon 39.

★Great Wave ... 30 day MBG

KidsTime, Amer. Discov., KidsMath *ea.* 26.

4334 NumberMaze *(B&W)* 26. 8527 *(Color)* 36.

NumberMaze Decimals & Fractions

8043 *(B&W)* 26. 8044 *(Color)* 36.

★HyperGlot Software ... 30 day MBG

Word Torture - Beginner to Advanced *(Span., Fren., Germ., Ital. & Rus.)* *ea.* 29.

Pronunciation Tutor - Beginner *(Span., Fren.)* . . *ea.* 35. *(Germ.)* . . 39.

Verb Tutor - Intermediate *(Spanish, French, German)* . . . *ea.* 39.

6611 Kanjimaster - Beg. *(Japanese)* 99.



International Business Software

8581 *DataClub 1.1 (3 user)*–*Honorable Mention*–1990 MacUser Editors' Choice Award for *Best Work-Group Product*. Parallel processing performance, centralized server access, & practically unlimited storage–needs no dedicated hardware . . **$199.**

Individual Software

Training for Word or PageMaker *ea.* $35.

★Inline Design ... 30 day MBG

5870 Bomber 1.3 *(includes headphones)* 32.

7622 Darwin's Dilemma 1.0 32.

8809 Tesserae 1.0 32.

★Learning Company ... 30 day MBG

2670 Reader Rabbit 2.2 *(CP) (ages 4-7)*. . 30.

5453 Talking Math Rabbit 2.0 *(ages 4-7)* . 30.

★Leister Productions ... 30 day MBG

7126 Reunion 2.0 95.

★Microsoft ... 30 day MBG

2868 Flight Simulator 1.02 *(CP)* 32.

★Mysterium Tremendum ... 30 day MBG

5841 Moriarity Revenge *(CP)* 32.

★Nordic Software ... 30 day MBG

8258 Turbo Math Facts 1.1 26.

8260 Word Quest 1.0 31.

8257 PreSchool Pack 1.0 36.

Passport Designs

8253 TRAX 2.0 59.

8254 Desktop Music Creativity Kit 189.

3117 Master Tracks PRO 4 4.1.4 319.

8250 Encore 1.3.1 379.

Eddy H.M. - Best Music Product

8880 Alchemy 439.

3115 MIDI Interface 85.

★Penton Overseas ... 30 day MBG

VocabuLearn/ce Levels I & II *(French, Italian, Spanish, German, Russian, Hebrew, & Japanese)*. *ea.* 35.

★Personal Training Sys. ... 60 day MBG

We carry over 60 learning levels from beginner to advanced for Quark XPress, Excel, Persuasion, FileMaker II/Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, and the Mac *ea.* 52.

Postcraft

6466 Citadel 26.

Premier Technology

Strategic Conquest or NetTrek . *ea.* 34.

Sierra On-Line

3397 Leisure Suit Larry *(CP)* 23.

Sir-Tech Software

8228 Wizardry II *(CP)* 29.

★Software Toolworks ... 30 day MBG

4619 Mavis Beacon Typing 1.3 *(CP)* 32.

4588 Life & Death *(CP)* 32.

★Spectrum Holobyte ... 30 day MBG

3464 Tetris 1.1 22.

6112 Welltris 1.1 22.

Eddy H.M. - Best Recreation Program

8180 Faces 24.

Vette! or Falcon 2.2 *ea.* 32.

★Spinnaker ... 30 day MBG

2328 Sargon IV *(CP)* 28.

★Strategic Studies ... 30 day MBG

8084 Halls of Montezuma 26.

8085 Panzer Battles 26.

StudyWare

ACT, GMAT, GRE, or SAT Prep . *ea.* 29.

8098 LSAT Prep for the Mac 35.

★Terrace Software ... 30 day MBG

8192 Mum's The Word *(gardening)* 79.



Symantec ... 30 day MBG

6748 *Norton Utilities for the Mac 1.0*–1990 MacUser Editors' Choice Award for *Best Utility*. "Has redefined the state of the art of data-recovery software. An excellent collection of tools that speed up disk-related work." . . . **$84.**

★Toyogo ... 30 day MBG

7624 Nemesis Go Master 4.7 41.

7623 Nemesis Go Master Deluxe 4.7 85.

★XOR ... 30 day MBG

8061 MacSki 1.01 40.

6040 MacGolf Classic *(CP)* 52.

NETWORKS & COMMUNICATIONS

★Abaton ... 30 day MBG

6266 InterFax 24/96 Modem 349.

Applied Engineering

8365 DataLink Express 175.

DataLink/Mac or Mac Portable *ea.* 209.

8938 DataLink LC 265.

8362 QuadraLink 209.

★Beagle Bros. ... 30 day MBG

7691 Flash 1.1 127.



Softsync/BLOC ... 30 day MBG

7129 *Accountant, Inc. 2.0*–*Honorable Mention*–1990 MacUser Editors' Choice Award for *Best Financial Management Pkg.* Integrates General Ledger, Payables, Receivables, Payroll, Inventory and Project Management **$345.**

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5737 *After Dark 2.0T*–New! Over 30 displays & SOUND. Ticking clocks, thunder, munching worms. Use company logo, messages. Great Fish, Flying Toasters, & MultiModule. Random display, & password sleep. **$22.**

★CE Software ... 60 day MBG
5173 QuickMail 2.2.3 *(10 user)*. 315.

★CompuServe ... 60 day MBG
1676 Macintosh Membership Kit 1.03 . . . 23.
1673 CompuServe Navigator 3.0 49.
1674 Membership Kit/Navigator Bundle . 69.

★DataViz ... 60 day MBG
1823 MacLink Plus/PC 5.0. 117.
4842 MacLink Plus/Translators 5.0 98.

Dayna Communications
8719 EtherPrint. 349.
Eddy - Best Connectivity Hardware
8720 DaynaTALK *(5 Pak)*. 389.
8721 DaynaTALK *(10 Pak)*. 695.

★Dove Computer ... 60 day MBG
6758 DoveFax Desktop 1.1.1 299.

★Dow Jones ... 30 day MBG
5295 News/Retrieval Membership Package 24.

EveryWare
8077 AllShare 1.0 139.

★Farallon Computing ... 30 day MBG
5707 Timbuktu 3.1 95.
Eddy - Best Connectivity Software
4867 Timbuktu 3.1 30-Pack. 1285.
4866 Timbuktu/Remote 2.0 123.
6371 Timbuktu/Remote Access Pack . . 845.
8707 Liaison 3.0 259.
6273 PhoneNET StarConnector 10-Pack. 129.
4869 PhoneNET Connector 10-Pk *(DIN-8)* 198.
2206 PhoneNET StarController 300 825.
6687 PhoneNET StarController-EN. . . . 1589.
6766 MediaTracks. 189.
Eddy H.M. - Best Multimedia Software
6768 MediaTracks Multimedia Pack. . . . 319.

★Freesoft ... 60 day MBG
6115 White Knight 11. 85.

★Global Village ... 30 day MBG
8946 TelePort A300 129.
Eddy - Best Communications Product
8945 TelePort/FAX. 185.

Hayes
2300 Smartcom II 3.2 84.
2307 Smartmodem 2400. 349.
5991 V9600 Baud Modem 689.

Insignia Solutions
7557 Access PC 1.0 62.
7058 SoftPC-AT/EGA Module 125.
4089 SoftPC 1.3 245.

Intel Corporation
5119 2400EX Modem $179.
6420 2400EX MNP Modem. 229.

International Business Software
8581 DataClub *(3 user)* 199. 8580 *(10 user)* 539.
Eddy H.M. - Best Work-Group Product

★Kennect Tech. ... 30 day MBG
5631 Rapport 1.3.4 195.
7588 Drive 360 *(5¼")* 249.
7590 Drive 1200 *(5¼")* 249.
5632 Drive 2.4 *(3½") (incl. FastBack II)* . 325.

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8027 MacModem V.32 689.

★Nuvotech ... 60 day MBG
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6751 TurboNet ST *(12-Pack)*. 279.
6272 NuvoLink SC 389.

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6949 OrchidFAX Modem 1.06. 429.

★Practical Peripherals ... 30 day MBG
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8348 24/96 Minifax 199.
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8738 9600M Plus 599.
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4347 NetBridge. 409.
4942 TeleBridge 409.
3443 NetModem V2400 3.3 339.
6917 NetModem V.32 *(V.42 & V.42 bis)*. 1169.
Eddy H.M. - Best Connectivity Hardware
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8189 FastPath IV 1889.

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3720 TOPS Flashcard 155.
6264 TOPS Networking Bundle 3.0 187.



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★Solutions, Inc. ... 60 day MBG
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★Synergy ... 30 day MBG
6618 VersaTerm 4.5. 88.
6619 VersaTerm-PRO 3.5. 174.

★Traveling Software ... 60 day MBG
3729 LapLink Mac III Connectivity Pac . . 93.

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6686 UPS 370ci 329.

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Diana Robinson

Diana Robinson
Diamond Bar, CA

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★Avery ... 60 day MBG

4807 Laser Labels 1" x 2⅝" *(Qty. 3000)* . 24.
5392 Disk Labels 3½"-*Laser (Qty. 630)* .. 29.
4865 Address Labels 3½" x 15/16" *(3750)*. 15.
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6091 The Organizer..... 199.

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8046 MVP Mouse 89.

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6129 Ultimate SE/Ext. Carrying Case.... 79.

★Kensington ... 30 day MBG

2559 Apple Security Kit..... 33.
6763 SE Radiation/Anti-Glare Filter 52.
2566 System Saver Mac *(platinum)* 63.
5064 Apple Color Monitor Polarizing Filter 63.

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8795 Switch Box *(2 Pos.)* 32. 8796 *(4 Pos.)* 49.

★Mobius Technologies ... 60 day MBG

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2692 Moustrak Pad *(large 9" x 11")*..... 9.
2693 Moustrak Pad L/F *(large 9" x 11")*.. 10.

Ribbons

3255 ImageWriter II Ribbon Black 4.
3261 ImageWriter II Ribbon Multi-4-Color . 9.

★Sopris Softworks ... 60 day MBG

4014 High Trek Mac SE & Ext. Kybd. Case 69.
4861 SE Protection Pack *(std. keyboard)* . 65.
4862 SE Protection Pack *(ext. keyboard)* . 75.



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8586 40 MHz PowerCache IIci..... 949.
8585 50 MHz PowerCache IIci..... 1689.
8583 SCSI PowerCard..... 1095.
25 MHz PowerCard 030 *(II,IIx,IIcx)* ea. 1095.
40 MHz PowerCard 030 *(II,IIx,IIcx)* ea. 1389.
50 MHz PowerCard 030 *(II,IIx,IIcx)* ea. 1895.
GDT Softworks
6256 PrintLink Collection 4.0..... 59.
6151 JetLink Express 2.0 89.
8960 ParaLink Express 99.
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6514 HP DeskWriter Printer..... 759.
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19" 8-bit System for SE/30 or II *ea.* 4295.
7840 19" 24-bit Color System for Mac II 6395.
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7149 Xceed IIci-128 Cache Card..... 239.
6680 Xceed for SE/30 *(640 x 480)*..... 329.
★**MicroSpeed ... 30 day MBG**
6620 MacTRAC..... 62.
Eddy H.M. - Best Input Device
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8319 20" Color Trinitron: SE/30, II, IIsi *ea.* 2595.
★**Orange Micro ... 30 day MBG**
3036 Grappler 2.0 *(9 pin)* 87.
6229 Grappler LX 134.
Pacific Data Products
7412 Pacific Page PE 4.0 for the Mac .. 529.
RasterOps
8526 Video Expander 529.
7469 ColorBoard 264 for SE/30..... 659.
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7468 ClearVue/GS System for Mac II .. 1699.
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8009 PowerKey 65. 8008 Wake-Up Cable 32.
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8653 Galileo I Video Board *(for Mac SE)* $449.
7817 16 MHz Mercury 030 *(for Mac SE)*. 369.
8624 16 MHz Mercury 030 *(for Mac Plus)* 499.
7816 20 MHz Gemini 030 799.
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7814 33 MHz Gemini II 030 1199.
8371 40 MHz Gemini II 030 1339.

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8316 2 Meg SIMMs Set *(80ns)*..... 99.
7497 1 Meg SIMMs for Mac IIfx *(80ns)*... call
Applied Engineering
8361 1.44 Meg High Density Drive 229.
8369 MacRam Portable with 1 MB..... 399.
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Shiva ... 30 day MBG
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3991 45+ Meg Hard Drive 449.
5275 60+ Meg Hard Drive 489.
5276 80+ Meg Hard Drive 539.
5456 45 Meg Removable Drive..... 649.
5736 45 Meg Removable Cartridge..... 79.
Dayna Communications
8723 DaynaFILE 360k Drive 449.
8722 DaynaFILE 1.2 5¼" Drive 449.
8927 DaynaFILE 1.44 MB..... 629.
8725 DaynaFILE Dual 360k & 1.2 MB.. 669.
8724 DaynaFILE Dual 360k & 1.44 MB. 739.
★**Dove Computer ... 60 day MBG**
MaraThon 030 Upgrades ... *ea.* 529.
8186 MacSnap 524XE 199.
8187 MacSnap 524XS *(w/SCSI Port)* 249.
8649 MacSnap 596XE *(4 MB)*..... 299.
8652 MacSnap 596XS *(4 MB w/SCSI Port)* 365.
Peripheral Land, Inc. (PLI)
8335 PLI TurboFloppy 1.4..... 309.
8334 PLI SuperFloppy 1.4..... 449.
8336 PLI DOS Floppy 469.
8333 PLI Sony 40 Turbo Ext. Drive..... 489.
8327 PLI Infinity 40 Turbo 749.

UTILITIES

Three Archiving Packages

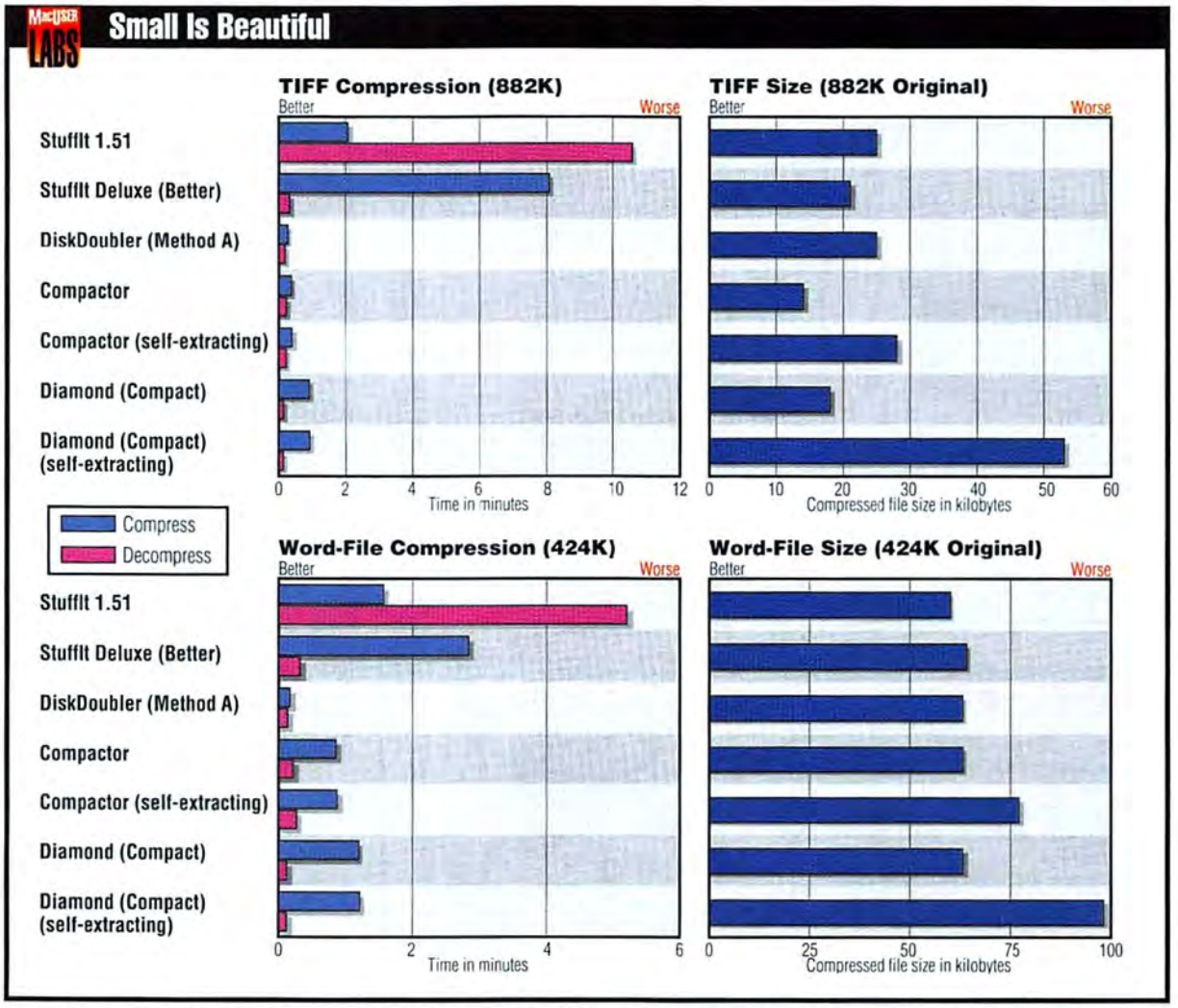
Compactor, the Eddy-winning shareware program, and DiskDoubler threaten StuffIt's dominance.

For a long time, StuffIt has been the most popular utility for compressing and archiving files. Virtually every BBS and on-line service stores its files in StuffIt format. But StuffIt is showing its age. Having looked at StuffIt Deluxe recently (see review, December '90, page 68), I tested DiskDoubler, Compactor, and Diamond to discover which was the easiest to use and which produced the smallest files in the shortest time. All were dramatically faster than StuffIt, and the first two are a real challenge to the de facto standard.

DiskDoubler

DiskDoubler consists of an application and an INIT. You'll rarely open the application. You can do everything necessary with the DD menu that the INIT adds to your desktop. To compress or decompress a file, select its icon on the desktop and choose the Compress or Expand command in the menu. If you select a disk or folder, the command will apply to all the files within it. The filenames and their locations within folders always remain the same. In addition to its own compressed files, DiskDoubler also expands archives created with StuffIt through version 1.5.1 and PackIt III through version 1.3.

DiskDoubler was designed to stretch disk space. You initially compress your document files, saving 50 percent or more of their normal size. You can select between two compression methods. Method A consistently makes smaller



Although most of the compressed files were about the same size, the time it took to produce those files varied widely. The times and file sizes shown are for the smallest compressed file produced by each package. Tests were run on a Mac IIcx with 8 megabytes of RAM in 8-bit-color mode under the Finder. The results for StuffIt and StuffIt Deluxe are presented for comparison.

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files in less time. Double-clicking on a compressed file's icon automatically decompresses the file, launches the file's original application, and opens the file. Compressed files even appear within the Open dialog box of their applications and can be opened in the same way as uncompressed files. When you quit an application, DiskDoubler automatically recompresses previously compressed files.

Although DiskDoubler can combine multiple files into a single archive, it can't decompress individual files — it's all or nothing! It's also unlikely that other users will have a copy of DiskDoubler lying around to decompress any files you give them, because the program hasn't achieved the industry-standard status of StuffIt. DiskDoubler includes expand-only versions of both the application and INIT, which you can distribute freely with your files, but these add-ons occupy 154K of valuable disk space. And those extra bytes may mean the difference between getting everything onto one disk or two or may generate a fair amount of additional on-line time.

Compactor

Compactor is a shareware application that promises to become the next StuffIt — at least as far as the noncommercial world is concerned. Its archive windows and operation are similar to those of the original StuffIt, but it's much faster and consistently makes the smallest files. Its real strength, however, is its optional ability to create self-extracting archives. Simply double-clicking on the archive decompresses it, even when Compactor is unavailable. The self-extracting feature adds a measly 14K to an archive — or less than one-tenth of DiskDoubler's add-ons. Compactor unstuffs StuffIt files through version 1.5.1.

Diamond

Diamond also operates as an application. Its simple interface has only four menu commands. The Pack and Unpack commands bring up a dialog box in which you choose the file, folder, or disk to compress or decompress. Extract lets you decompress individual files and folders from an archive. Preferences displays a dialog box in which to set your preferences and select among three compression levels or no compression. The TIFF and spreadsheet archives are the same size no matter which compression level is used. Like Compactor, Diamond optionally creates self-extracting archives. This option adds about 35K to each archive.

The Bottom Line

DiskDoubler has the simplest interface: It lets you use compressed documents without changing your normal way of working, it is very fast, and it makes very small files. Unfortunately, its inability to decompress selected files from archives makes it a poor archive utility. Compactor, at $25, is the best value in the group, even though it lacks the convenience features that DiskDoubler and StuffIt Deluxe offer. Compactor consistently created the smallest compressed files, and its performance is rapidly winning it converts — especially among on-line users. Its speed and self-extracting function make it an ideal tool when you're preparing to send a file to someone, because you don't have to worry about whether or not the recipient has the software necessary to decompress your package. Other than its simple interface and very fast decompression times, Diamond has little to recommend it.

— Darryl Lewis

Get Info

DiskDoubler

$4444

Published by: Salient Software, 124 University Avenue, Suite 103, Palo Alto, CA 94301; (415) 852-9567.
Version: 3.0.1.
List Price: $79.

Compactor

$5555

Published by: Bill Goodman, 109 Davis Avenue, Brookline, MA 02146; written inquiries only.
Version: 1.21.
List Price: $25 (shareware).

Diamond

$333

Published by: Sextant Corp., 1501 Laurel Street, Sarasota, FL 34236; (800) 262-6665 or (813) 954-5622.
Version: 5.3.
List Price: $75.



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PERSONAL INFO MANAGERS

Planisoft

Planisoft shows promise, but it's not yet the king for tracking contacts and appointments.

When it comes to keeping track of time and appointments, I've tried everything from Layered's Front Desk to HyperCard. I even tried Chang Lab's C•A•T III and found it too confusing and unintuitive. I finally settled on a custom application built in Odesta's Double Helix. And then Planisoft from asd Software arrived, and it was exactly what I wanted — almost.

Several Appointments

Planisoft's central theme is multiple schedules. You can use it in single-user mode, but it is best when it's attached to a network and the appointment files are merged. A secretary can use the single-user mode to track several individuals, but the software is intended to be installed on individual Macs that share an AppleShare or TOPS volume.

Its primary function is tracking appointments. Dragging the cursor over the appropriate time segments in the rolling weekly calendar sets an appointment. If your appointment is with someone familiar, you can pick the name from a list. If the name is new, the program presents you with a contacts entry form in which you can enter the person's phone number and address. Once you've set an appointment, Planisoft lets you call the person via the speaker in the Mac or via modem.

Planisoft can assign up to four appointment codes when you initialize a new appointment. The calendar view uses the appointment codes to display a schedule in more than one dimension. You can always see what time your appointments are, but by clicking in the lower left-hand corner of the screen (or by switching among categories in the Appointment Codes window), you can view your appointments by type of activity, by location, and by two user-defined codes. Managers will find the visual information about their clients' locations good for gauging traffic, and the activities view

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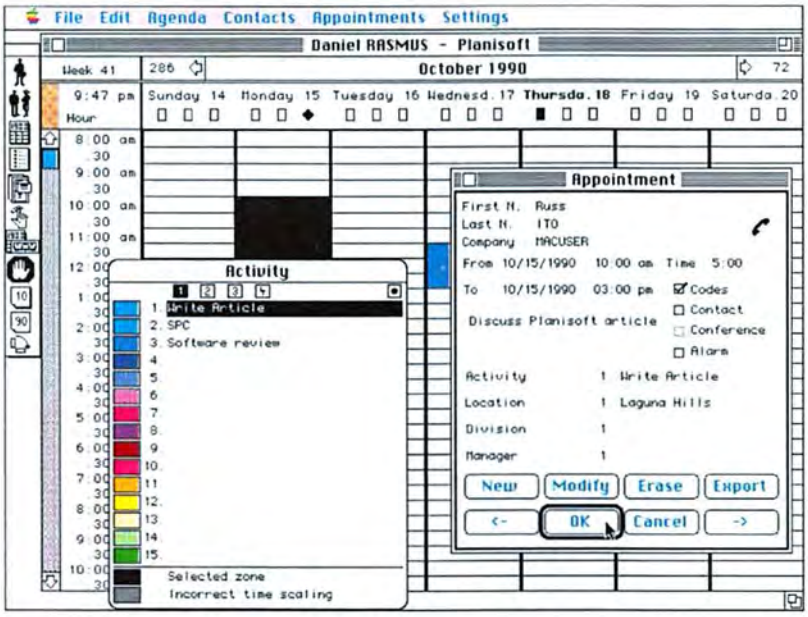
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*Based on a Macintosh Plus with a 20 megabyte hard disk. Tests performed with a 24-page document. Full repagination performed. **Actual number limited only by available disk space. ***Uses advanced virtual memory design. © 1990 T/Maker Company. All rights reserved. The following are registered and unregistered trademarks for the companies listed: WriteNow, T/Maker, and SmartBundle are a trademarks of T/Maker Company. Macintosh, Mac: Apple Computer, Inc.; Microsoft, Microsoft Corporation. Full Impact, Ashton-Tate Corporation. RecordHolderPlus, Software Discoveries, Inc.; SuperPaint, Silicon Beach Software. MacUser, Ziff Communications Co.

T/Maker.

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Planisoft is an integrated appointment and time-management program that needs more database capabilities to make it viable for power users.

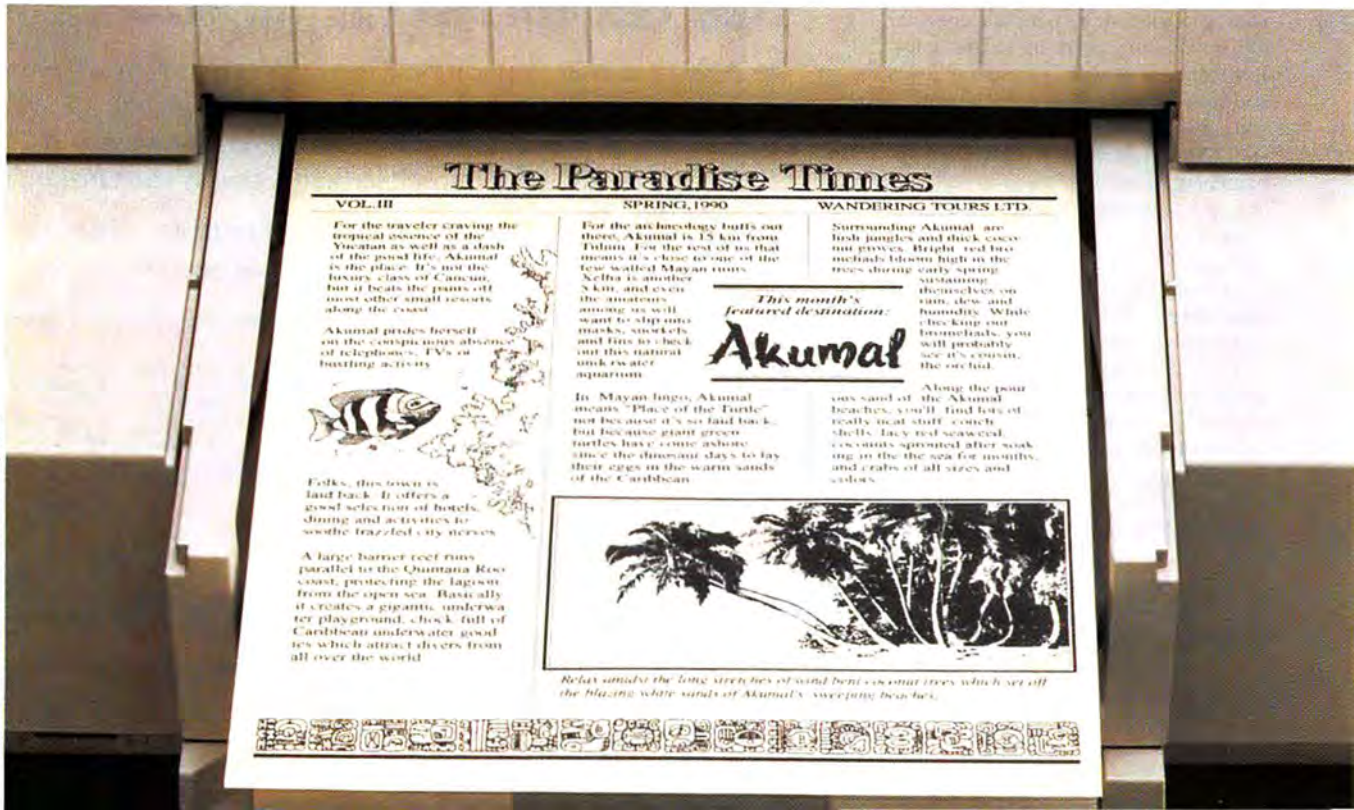
tells them how many times they need to shift mental gears. You can define other codes for personal or office needs.

The program can set schedules days or even years in advance. It can also integrate to-do lists, priorities, and deadlines. These functions are not tied to appointments and act only as simple reminders. The icons across the top of each day in the calendar represent to-do lists, priorities, and deadlines and provide single-click entry or retrieval of these information categories. These icons — actually squares, dots, and diamonds — have no contextual meaning, but there are only three of them, so you should be able to remember which is which very quickly.

Groups of people are linked with the Group command, which makes it easy to locate schedule conflicts and to schedule appointments with several people in a group. For law offices or manufacturing facilities, this feature alone can be worth the cost of the program.

On the whole, Planisoft is an easy-to-use, well-integrated system. You can call

With the HP DeskWriter, you can



*Suggested U.S. list price. © 1990 Hewlett-Packard Company. PE12065
Documents created using Microsoft® Word and Aldus PageMaker®.
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your appointment's contact seconds after clicking on the phone icon in the Appointment window, and you can quickly see overviews of your entire week. To-do lists and deadlines help keep you on track, and the icon-driven tool panel and menus are uncluttered and easy to follow. The program also comes in a Windows version that can share files with the Mac edition and vice versa.

Schedule an Update

Being easy to use and being a good tool are two different things, however. I found Planisoft's scheduling portion well conceived and constructed, but its contacts database is flawed. The structure of my contacts file is ever-changing, but Planisoft won't let me change the structure of the database by adding new fields. This limits its usefulness and necessitates the use of a custom database application for functions Planisoft does not have. I don't like typing information into my computer more than once (or even importing and exporting records among applications). If you want to use it in addition to your own database manager, Planisoft has export file formats for most popular word processors and database programs.

Although Planisoft is well integrated and easy to use, its programming does need modifications beyond the database part. Windows, such as the Appointment window, that look as though they're floating above the schedule's plane are modal, so clicking on the schedule does nothing. I'd like to start entering an appointment and be allowed to click on the schedule to check another function and return to my waiting Appointment window. Planisoft works with one appointment or information item at a time.

The program's manual is thin and doesn't include an index, which makes finding information on defining your own appointment codes impossible.

The Bottom Line

Planisoft is almost the software I've always wanted. If the to-do list, priorities, and deadlines were better integrated into the application (cross-referenced both to each other and to my appointments) and if they could be manipulated in a text-editing screen — or even better, an outliner — I might trade in my Helix application, but when it comes to managing my schedule, the tool I use has to fit my needs precisely.

Planisoft has ease of use down pat, but it needs to be more flexible before it'll be truly useful.

— Daniel W. Rasmus

Get Info

Planisoft

★★½

Published by: asd Software, 4650 Arrow Highway, E-6, Montclair, CA 91763; (714) 624-2594.

Version: 1.1.

List Price: $349; five-pack, $895; ten-pack, $1,295.

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UTILITIES

Now Utilities

The previous version of Now Utilities was a hit-and-miss affair, but the latest one is a winner.

Now Utilities 2.0 is a dramatic improvement over version 1.0. Now Software has added important new programs and beefed up and knocked the rough edges off others. Even better, the price is now a bargain at $129. Now Utilities 2.0 promises to make your Mac faster, easier, and — yes — more fun to use.

Super Boomerang

The star of Now Utilities 2.0 is a newcomer, Super Boomerang, a hyper-charged version of Hiroaki Yamomoto's shareware favorite, Boomerang. Super Boomerang adds a menu bar to the standard dialog boxes you use to open and save files. It automatically remembers names of folders you've opened and files you've opened or saved, and it lists up to 30 of these in its File and Folder menus. Select a file or folder from the menus, and Super Boomerang instantly takes you to it. And if you don't remember the complete name or location of a file, Super Boomerang's lightning-fast Find command supports wildcard searches and zips through the contents of even the largest hard-disk drive.

You can combine applications and DAs in up to five groups, each of which shares a list of files and folders (any applications you don't group share a universal file-and-folder list), and you can switch from group to group at any time. The Rebound feature remembers and automatically scrolls to the last item you selected in any folder. An editing view lets you change the order in which files are listed (by name, modified date, type, creator, or size) in the currently open folder and rename or delete them.

The DirectOpen option adds a hierarchical menu of available files next to the Open command in any application's File menu. You can open any file on this menu just by selecting the filename.

Although Super Boomerang can't decompress StuffIt archives, as can its nearest competitor, Aladdin Systems' ShortCut, Super Boomerang is, in all other ways, the best open/save-file enhancer on the market.

Now Menus

Now Menus is better than ever. It pops up a hierarchical version of your menu bar wherever you click on the desktop or if you use a user-definable key-and-click combination. If you're running MultiFinder, this menu also lets you jump to any open applications or DAs (new). Hold down the Option key as you switch

With the HP ScanJet Plus, you've

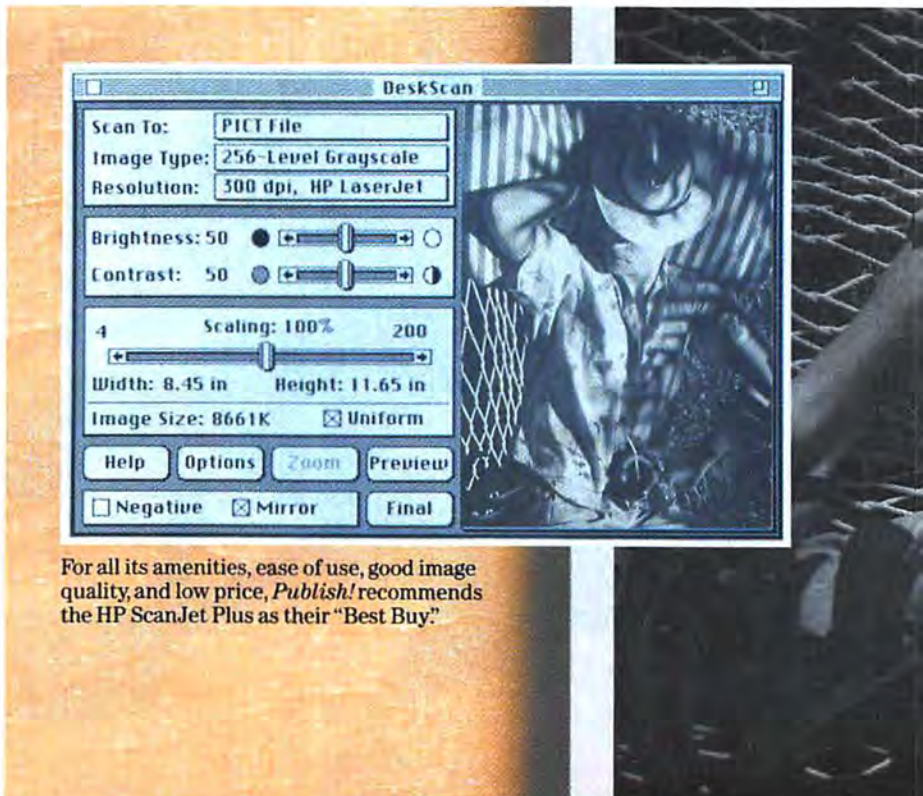
The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

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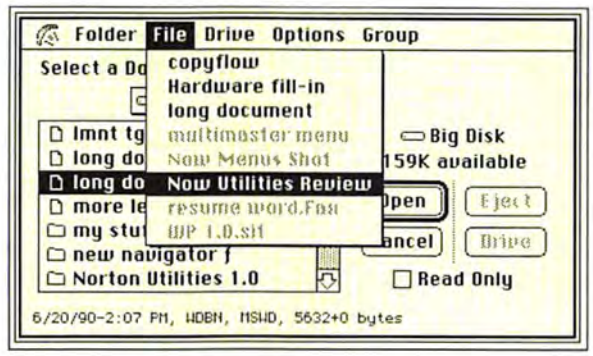
HEWLETT PACKARD



For all its amenities, ease of use, good image quality, and low price, *Publish!* recommends the HP ScanJet Plus as their "Best Buy."

applications, and (also new) Now Menus hides the windows of the application you're leaving, sparing you the embarrassment of MultiFinder screen clutter. Now Menus enhances your Apple menu, showing every DA's menu as hierarchical submenus. It also makes a submenu of every available cdev, so you can open the Control Panel with whatever cdev you choose at the top of the list. It also adds a Chooser submenu. Just pick an item from the list, and it'll automatically be selected when the Chooser loads.

A new utility, MultiMaster, works very much as On Cue does. Click in the corners of your menu bar or use a key-click combination, and MultiMaster pops up a menu listing of your installed applications. You can launch any listed application by selecting it and can attach frequently used documents to an application's name. Some of MultiMaster's features caused my system to freeze occasionally, however, and I sometimes had to click more than once in the menu bar to make the MultiMaster menu appear.



Super Boomerang is the gem of the current Now Utilities collection. It adds a menu bar to Open and Save dialog boxes and automatically remembers the names of files and folders as you open them.

Alarms Clock

Alarms Clock is little changed from the last version. It puts a clock in the right side of the menu bar and also lets you set a number of simple alarms. Alarms Clock seems to cause none of the problems that the freeware SuperClock does.

Startup Manager

If you've got lots of INITs, Startup Manager does a great job of controlling which of these critters load and in what order. You can even create groups of INITs, so you can quickly configure your Mac for different purposes. Startup Manager lets you change the order in which INITs load by dragging their names up and down in a list instead of by appending a number to the beginning of the file's name, as it used to do. However, it still turns a file "off" by changing the file type from INIT to xNIT, cdev to xdev, and so on. I prefer Microseeds' INITPicker, but Startup Manager is a capable alternative.

got it made in the shades.



*Suggested U.S. list price. © 1990 Hewlett-Packard Company PE12004

Other Goodies

Among the other Now Utilities, WYSIWYG Menus is a real sleeper. Not only does it list every typeface in a Font menu, using the appropriate screen font but it also combines font family names (similar to Adobe Type Reunion). It does sometimes cause keyboard shortcuts to vanish or be modified in the menus it affects, and it becomes sluggish in Microsoft Word.

Screen Locker allows you to password-protect your Mac. It's well designed but seems to crash a lot if you access the cdev with many other INITs running. Print Previewer is a Chooser device that lets you preview what documents look like before you actually send them to a printer. Customizer lets you modify the appearance of your Finder. Profiler prints a copious listing of information about your Mac, from current system software and hardware to all active INITs. DeskPicture lets you select a PICT file to replace your desktop pattern. Finally, FinderKeys lets you select a file in a Finder window by typing its name. You can copy and move files into other windows without making the destination window active — convenient if you have lots of open windows.

The Bottom Line

Now Utilities 2.0 is a terrific value. You could put together an equivalent package on your own, but you'd pay far more and you wouldn't have Super Boomerang. Now Utilities is a must-have for experienced Mac users and novices alike.

— Eric Taub

Get Info

Now Utilities
★★★★½
Published by: Now Software, 520 W. Harrison Street, Suite 435, Portland, OR 97201; (503) 274-2800.
Version: 2.0.
List Price: $129.

SECURITY

FileGuard and MaccessCard Reader

ASD Software's top-notch security package is the only Mac software that supports a magnetic-card reader.

FileGuard (originally reviewed in May '90, page 97) is one of the finest European Macintosh software imports and continues to keep pace with its competition. Some new features, fine-tuning, and

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support for the optional MaccessCard reader make FileGuard a hard-to-beat security package.

FileGuard version 2.5 offers the same transparent operation as earlier versions. DES encryption (a U.S. government standard) is, of course, still absent, but the proprietary encryption scheme seems solid. Once installed, this version adds the ability to protect folder access with an interface that's familiar to any AppleShare user. Hard-disk partitions can be similarly protected. FileGuard prevents the copying of applications on an individual-user basis and can create demo versions of software. FileGuard now comes with User Mover, a Font/DA Mover clone that lets you save backups of your user/group lists or transfer lists to other copies of FileGuard.

One of the most delightful new features is the way FileGuard builds groups (where users with similar access privileges can be assigned). You simply drag names from the User list to build the desired group.

FileGuard is still the only Mac security software that supports magnetic-card readers. The MaccessCard reader is a plug-and-play box that attaches to an ADB port or between your mouse and the keyboard. You can use Maccess cards to log on or enter your access key in any dialog box (rather than typing it in). You can also use most ATM or credit cards, so purchasing Maccess cards isn't required. The unit I used worked flawlessly with Apple keyboards but was incompatible with a DataDesk unit.

The Bottom Line

FileGuard adds folder and enhanced hard-disk protection that turns an already good program into an excellent one. This is a dependable and superbly implemented program, and the optional MaccessCard reader makes it an ideal choice for service bureaus or special security installations. The MaccessCard reader lets you add another level of security without severely altering your normal routine. Although it lacks some of the high-end capabilities of A.M.E., a security program from Casady & Greene, FileGuard, unlike A.M.E., doesn't force users to make painful adjustments to their work habits. It's sleek, fast, and safe. I highly recommend it.

— Gregory Wasson

Get Info

FileGuard

½½½½½

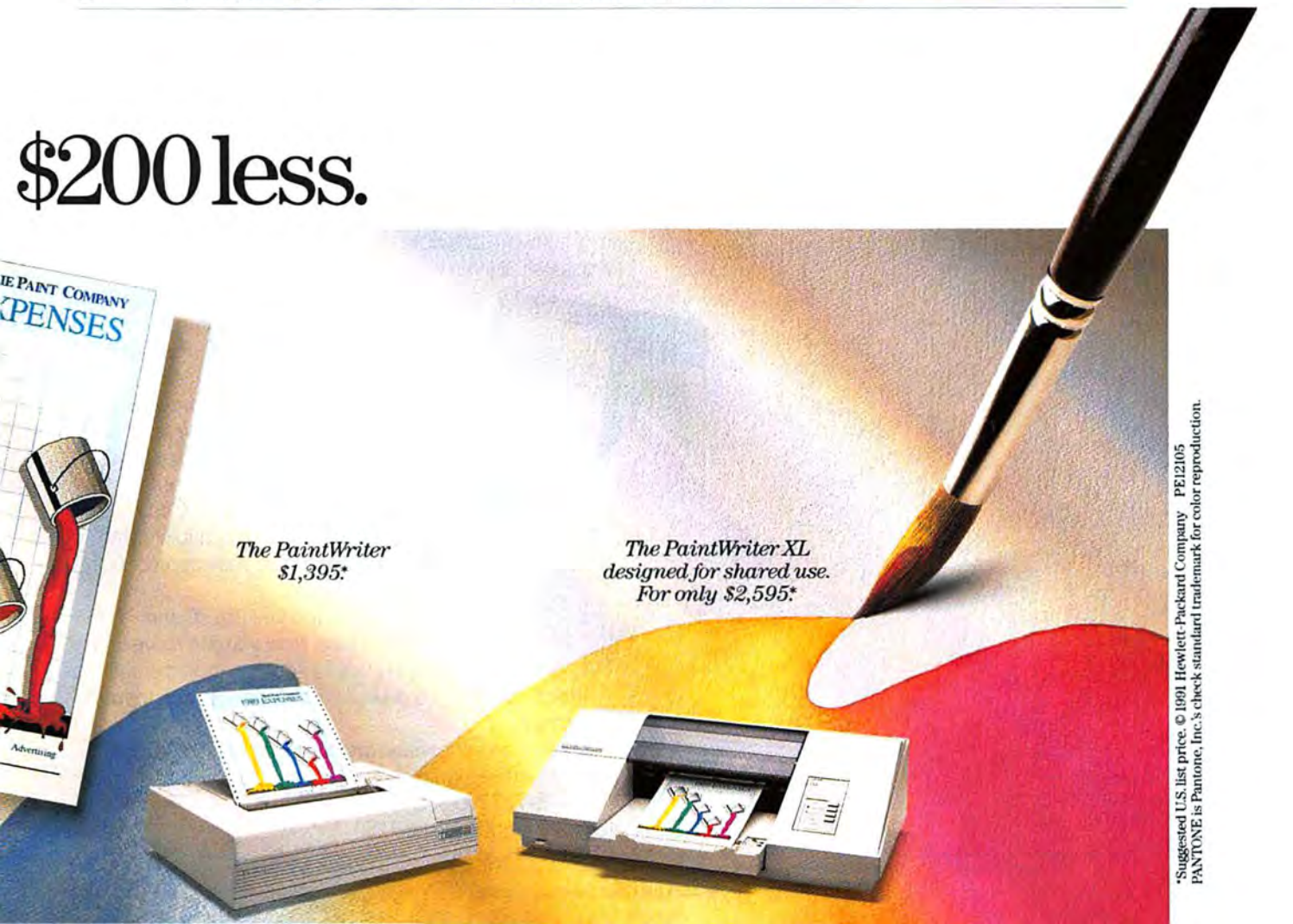
Published by: ASD Software, 4650 Arrow Highway E-6, Montclair, CA 91763; (714) 624-2594.
Version: 2.5.
List Price: $249.

MaccessCard Reader

½½½½½

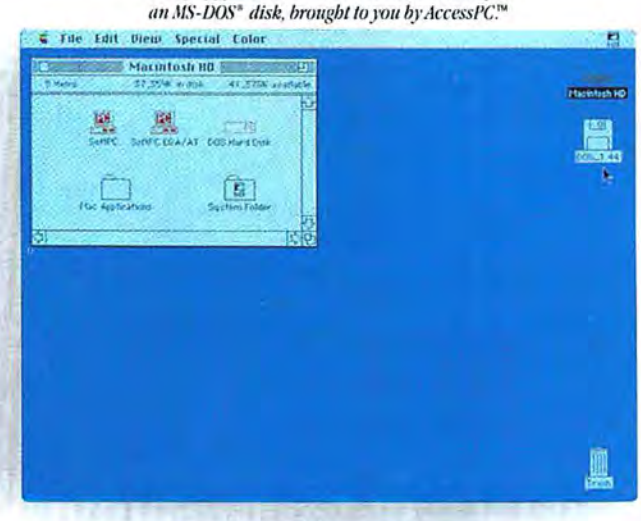
Manufactured by: ASD Software, 4650 Arrow Highway E-6, Montclair, CA 91763; (714) 624-2594.
List Price: $349.

$200 less.

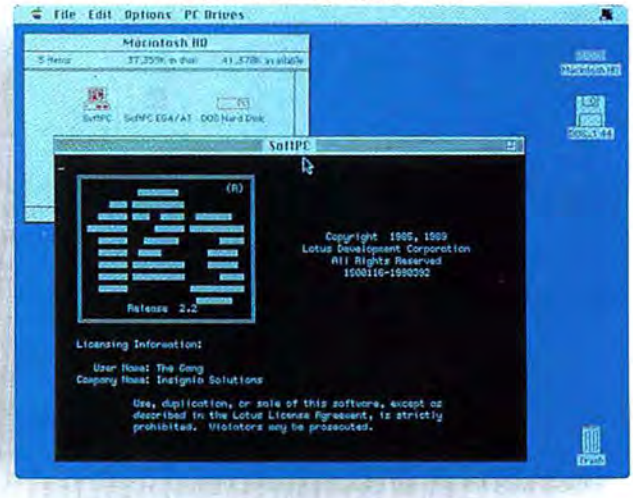


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FullWrite Professional

★★★★

FullWrite Professional is a program I want to like. Version 1.5 is now stable and easier to use than previous versions, but the program still lacks a few features.

FullWrite now has file-import filters for Microsoft Word versions 3.0 and 4.0; MacWrite 5.0; Word Perfect Mac; Multimate versions 3.3, 4.0, and Advantage; and PC Word Perfect versions 4.1, 4.2, 5.0, and 5.1. Many of these conversions are made through a separate program called Word for Word (see review, March '91, page 68), which isn't convenient.

Creating sidebars in version 1.5 is a vast improvement over previous versions. Moving and resizing sidebars requires only a point, click, and drag.

The FullWrite package now includes Tycho Table Maker. You can paste Tycho tables into FullWrite documents when the tables are completed, but you have to edit them in Tycho, which is not as convenient as creating tables directly in FullWrite.

Still missing from my wish list are smaller graphic sizing and direct support for MORE II and 3.0 outlines. Add-on utilities such as QuicKeys and OnCue still don't work when FullWrite is the active application.

FullWrite limits graphics to a size no smaller than 1 x 1 inches, which makes embedding small items difficult. Although FullWrite includes an outliner, I still use MORE, and I'd like to be able to import outlines directly into FullWrite. I would also like to see more formatting features, such as paragraph justification, moved from the Format menu onto the ruler.

FullWrite might be a good choice for users who shy away from Word because of its complexity. Most of its menus and features are well thought out and easy to understand. This bulky program needs 2 megabytes of RAM to run well.

Ashton-Tate, 20101 Hamilton Avenue, Torrance, CA 90509; (213) 329-9989. Version 1.5. $395.

— Daniel W. Rasmus



Checkwriter II

★★★★

Checkwriter II is a personal-accounting package that uses your checkbook like a ledger. The previous version was good, and although the current edition adds some interesting functionality, it's still not quite enough to push it all the way to the top of the heap.

Checkwriter II's main competition is Intuit's Quicken, but version 3.1 is not a Quicken-killer. Checkwriter II offers a lot of functionality at a reasonable price, but it still doesn't have Quicken's refined look and feel.

Checkwriter II's new features include an over-budget warning, which tells you when you're spending more money in a category than you allotted; a transfer command, which lets you transfer funds from one account to another easily; an address database; a set of drawing tools to design check forms; alphabetized budget reports; a Quicken file convertor; a WYSIWYG report preview; and an updater for recurring transactions. These are nice features, but they're not earth-shattering.

The one new feature that is bound to catch your eye is Checkwriter II's ability to let you print checks by feeding your personal checks through your laser printer or ImageWriter.

Other than this new check-writing feature, which is very handy, little has changed in this new version of Checkwriter. The system still has a credible interface, works smoothly, and offers you the option of seeing your financial information in horizontal-bar, vertical-bar, and pie charts, as well as in tabular-report form.

Compared with its competition, Checkwriter II has come a long way. Quicken still has an edge with its tax-itemization scheme, but Checkwriter II offers an automatic MacInTax link. Checkwriter II can be run as either a DA or as a stand-alone application. Checkwriter II is within pennies of providing more functionality than Quicken. In the next release, Checkwriter II may be No. 1.

Aatrix Software, P.O. Box 5359, Grand Forks, ND 58206; (701) 746-7202. Version 3.1. $59.

— Ken Landis



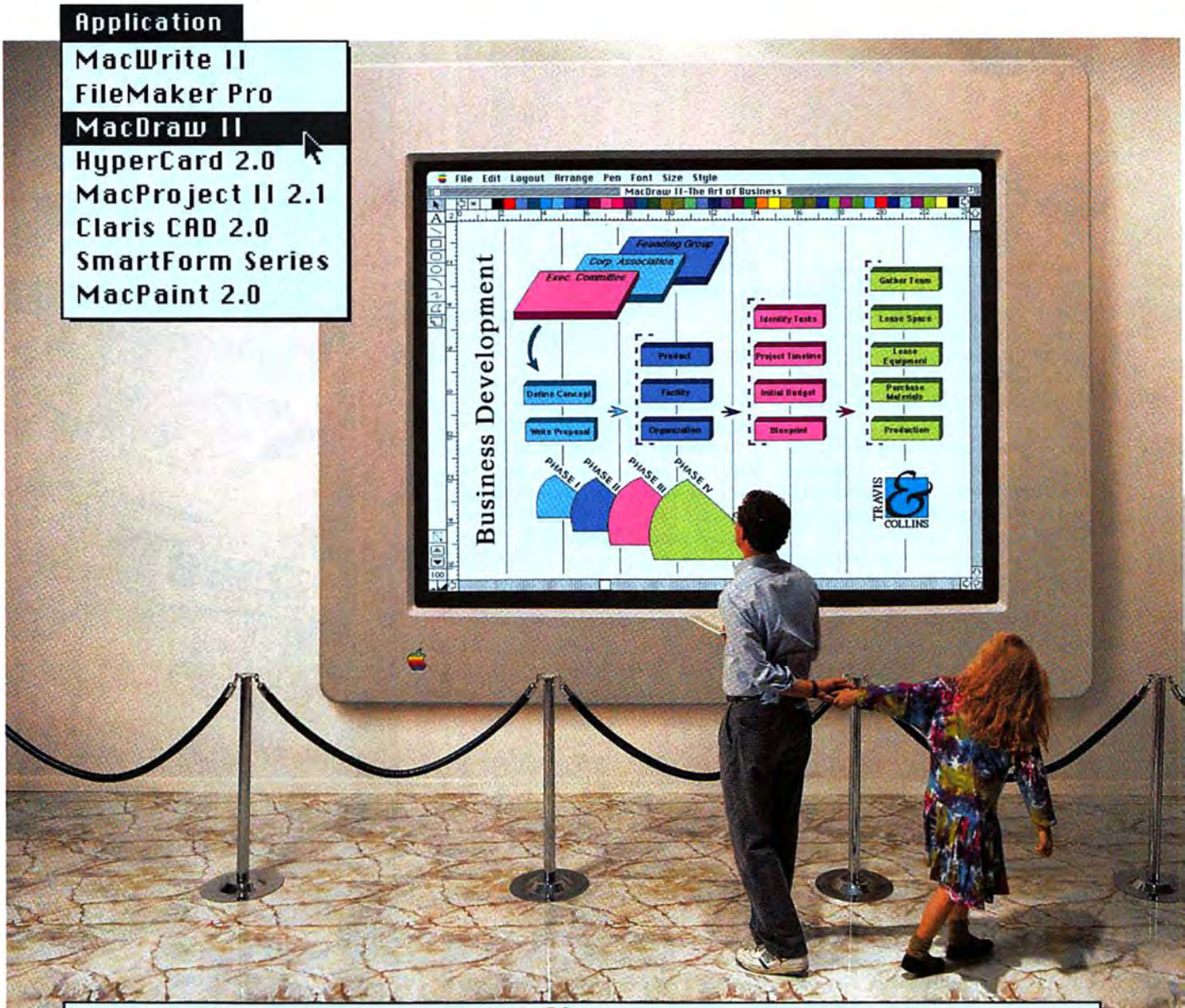
Where In Time Is Carmen Sandiego?

★★★★½

Where In Time is the fourth in the ever-popular Carmen Sandiego series. Where In Europe/USA/World Is Carmen Sandiego? teach geography to the young user; Where In Time adds time travel (read: history) to the geographic jaunt.



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Story

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Once again, the Acme Detective Agency has assigned you the task of tracking Carmen Sandiego and her gang across the globe. This time the baddies have come into possession of a time machine that lets them make off with international treasures from the past. Acme has supplied you with the Chronoskimmer 325i, a time-travel device that whisks you to 48 locations over the span of 1,500 years.

As you travel from one location to another, you gather clues about a particular villain who has, for example, absconded with the bulls of Pamplona. By questioning informants and witnesses, you learn about the villain's physical attributes as well as his artistic and literary preferences, and you pick up clues that let you track him to the next location in time. If you correctly guess the thief's identity and trace him to his final destination before the timer runs out, a robot is dispatched to haul the scoundrel to the hoosegow and you can progress to the next case.

Where In Time Is Carmen Sandiego? is bound to be a best-seller for the same reason that sugary vitamin supplements continue to find their way into children. Adults will buy this game for their kids because it's good for them, and the kids will want to play it because it's entertaining enough for them to excuse the educational inconvenience.

Brøderbund Software, 17 Paul Drive, San Rafael, CA 94903; (415) 492-3500. Version 1.0. $49.95.

— Christopher Breen



File Director

★★★★½

File Director consists of Disk Tools, File Director (formerly known as PowerStation), Calendar, Phone Pad, RPN Calculator, and Scientific Calculator.

The star is Disk Tools, an updated, classic Finder-replacement DA. It can do everything the Finder can — generally faster and usually easier. Disk Tools has all the expected file-manipulation capabilities, including application and document launching. There's a superb Find function that allows multiple-criteria searching. In addition to searching for parts of file names, you can search for dates (created or modified; exact or after), creator, file type, size, and even icon color. Search speed is impressive. A new feature is marking, or grouping, files. A group can be viewed and manipulated as if all its elements were in the same folder, even though they can be located in different folders and drives.

The second major component of the package is File Director. It's a launcher that uses pages of buttons to open applications, DAs, or documents. There can be as many as 16 pages of buttons with as many buttons as the screen size permits. Aside from the name change, there's no difference between File Director and the last version of PowerStation.

The Calendar DA is a basic monthly calendar that allows you to attach notes to any day. You can search for text in your note set and dial phone numbers directly. Notes covering any selected range of dates can be archived into a text file.

The Phone Pad DA is a notepad with an index. As with the Calendar DA, it can also dial phone numbers.

The two calculator DAs are powerful versions of the standard Mac Calculator DA.

Disk Tools is as good a Finder replacement as exists. Its marking and grouping features propel it to the top of its class. File Director is somewhat of an acquired taste, but if your file structure is complex, it can be a real time-saver. The four other DAs are good, useful programs.

Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809; (504) 291-7221. Versions: DiskTools, 3.0; File Director, 2.5.5. $129.95.

— Steven Bobker



WillMaker 4.0

★★★½

WillMaker 4.0 is the latest version of what has become an old standby. Nolo Press' package is a fairly basic program with the sole function of asking you pertinent questions for producing a will.

The program's interface is (still) pretty basic, but fanciness wouldn't add anything to it. It works easily and reliably. You can elect to see full information screens or just basic questions. The output is a rather plain document, but it meets all legal requirements. Wills can be saved as text and made fancy in the word processor of your choice. One of the few things you can't do, however, is make conditional bequests (such as Jon gets $10,000 if he leaves Hoboken).

The second part of the package is the combined manual and book about wills. It's detailed, easy to read, and generally excellent. There are lots of examples, which

ImageWriter Users:

Get the write stuff.

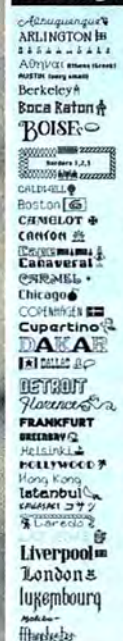
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aid greatly in clarifying some of the arcane details of will writing. The manual goes beyond basic wills into estate planning. It is clear about the limits of the manual as well as the software and doesn't hesitate to tell you to seek professional advice when appropriate. There is also some good advice about finding and dealing with legal professionals.

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Nolo Press, 950 Parker Street, Berkeley, CA 94710; (415) 549-1976. Version 4.0. $69.95.

— Steven Bobker



Darwin's Dilemma

★★★★½

"I used to be a better swimmer, but I outgrew it, thanks to . . . evolution." Emo Phillips would have felt right at home with Darwin's Dilemma, where, as the saying goes, the solution is evolution.

The setup is simple. The play window is made up of an invisible 9 x 6 grid on which reside icons representing life in simple to complex forms, starting with the lowly amoeba and progressing through different game levels to self-actualized Man. You are provided with a game piece, named Darwin, whose only purpose is to shove the icons in one of the four compass directions. You shove these icons either to position them or to combine them with like icons. An example: Your window contains, among other things, four amoebas. If properly combined, they become, through the process of evolution, a single paramecium. Position Darwin to bang the paramecia together, and you get a jellyfish. Jellyfish become octopi, octopi become crabs, and you're on your way. A technique called teleswapping lets you shift icons from one location on the grid to another, but beware: Teleswaps are limited.

That's all there is to it. Darwin's Dilemma is easy to play but difficult to win. To play Darwin's Dilemma properly, you need to plan several moves in advance and use your teleswaps judiciously. Yes, you can undo as many as 120 moves, but it costs points. Then again, points seem to be of little concern in this game. In Darwin's Dilemma, it's strictly survival of the fittest. Highly recommended for those who enjoy pondering and puzzling.

Inline Design, 5 W. Mountain Road, Sharon, CT 06069; (203) 364-0063. Version 1.0. $49.95.

— Christopher Breen



KiwiFinder Extender

★★★★

Like Aladdin Software's ShortCut and Now Software's Super Boomerang, Kiwi Software's KiwiFinder Extender tries to make the Open and Save dialog boxes more useful. But where the competition keeps only short lists of files or folders, KiwiFinder's file management is far more ambitious: It quickly sorts and organizes every file on your hard-disk drive.

KiwiFinder's Manager application creates a database about all the files on your hard-disk drive. You can view all your files organized into virtual folders. Using the Sort By menu, you can choose whether these folders are based on the first letter in a file's name, its type, creator, modification or creation date, actual folder, or any assigned keywords.

KiwiFinder adds a button to every Open dialog box. This button calls up a box similar to the Manager, except that the only visible files are ones that the current application can open. The program also adds buttons to Save dialog boxes for adding keywords and notes to a file.

Thanks to its indexed database, KiwiFinder has a fast and simple Find command as well as a fast and powerful Search command.

There are few drawbacks. If you're in a hurry to find a file, you may not appreciate the slight delay between clicking on KiwiFinder's button and the appearance of its window. Another bug I encountered once made it necessary for me to trash a drive's database and reindex it.

Despite this, KiwiFinder can still be a great time-saver if you've never gotten around to organizing your hard-disk drive. But if you enjoy shuffling files from folder to folder as your organizational needs change, stay clear of this baby.

Kiwi Software, Inc., 6546 Pardall Road, Santa Barbara, CA 93117; (805) 685-4031. Version 1.0.2. $99.

— Eric Taub



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MacUser

HARD-DRIVE BASICS

MacUSER LABS

If you own a Mac, you should own a hard-disk drive. If you own a hard drive, you should protect what's on it. MacUser Labs examined 32 of the best basic drives and now reveals the fastest and sturdiest. We also tested five programs that make your drive a safe place to store your files — and that rescue you when disaster strikes. If you don't own a hard drive, now's the time to buy one — and MacUser Labs shows you how best to spend your storage dollar.



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LIFE BEGINS AT 40 MEGABYTES: Small Hard Drives

Planning to add a modest-sized external hard-disk drive (40 to 50 megabytes) to your Mac? MacUser Labs tested 32 competing brands and came up with some that are best buys and some that are best left on the shelf.

Without a hard-disk drive, your Macintosh is little better than a toy. A hard-disk drive makes your Mac several times faster and much more convenient for daily use. Your important files and folders are waiting on your desktop, ready for instant access. Launching applications, copying and moving files, and saving your work all happen *quickly*.

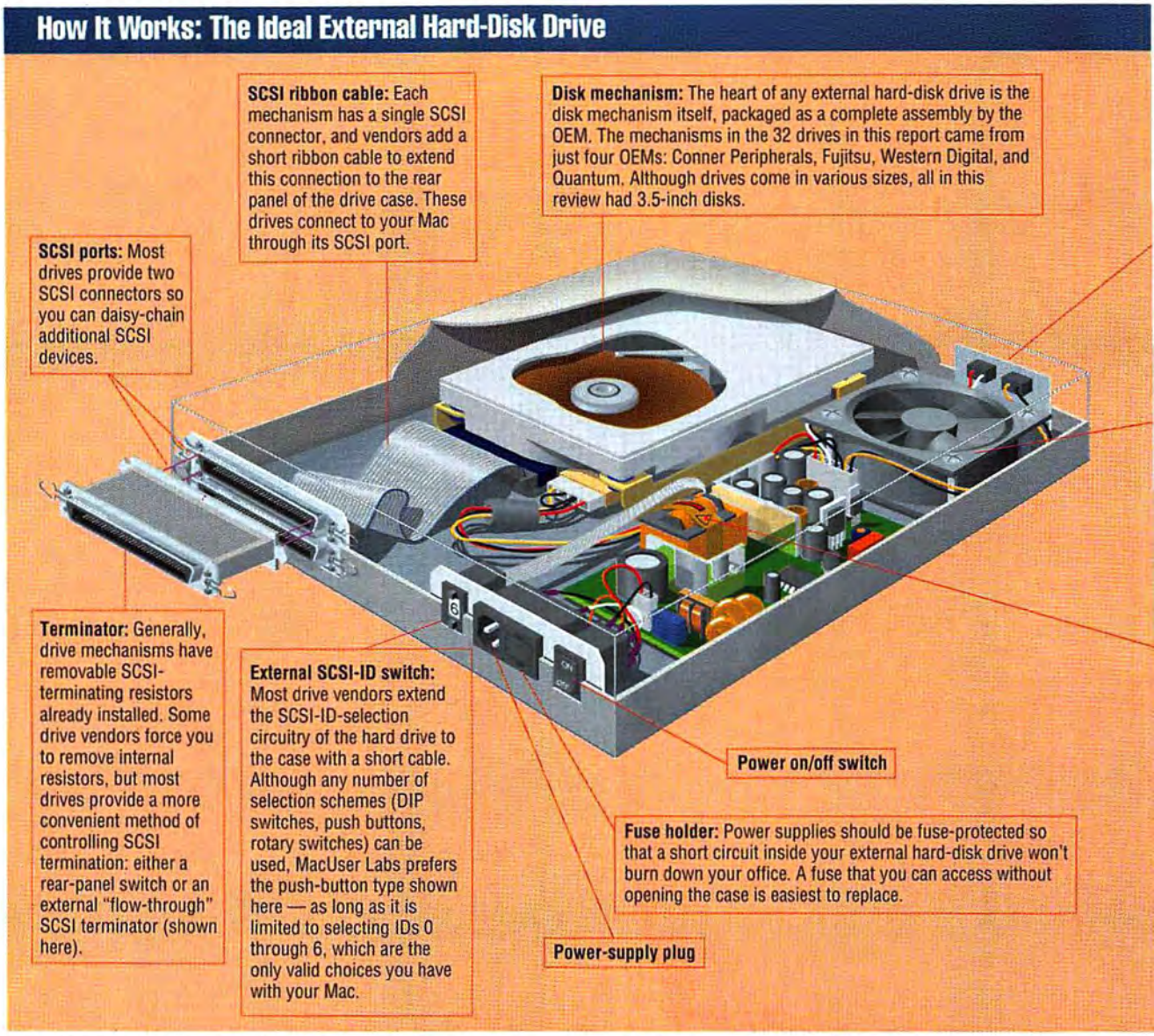
Many people discover too late how necessary hard-disk drives are — and how many drives are available at attractive prices. That's why MacUser Labs tested 32 external drives for this report. These drives simply plug into the SCSI port on the back of any Mac; the mass storage they provide will bring your Mac up to speed.

BY WINN L. ROSCH AND THE MACUSER LABS STAFF

PHOTOGRAPHY: WALT DENSON


Ehman
CUTTING EDGE
UltraDrive 40S

How It Works: The Ideal External Hard-Disk Drive



Adding one of these modest-sized drives can benefit nearly any Mac — or a network of them. Even if you already have an internal or external hard-disk drive, you can use one of the smaller drives for backup or totable storage. A compact external hard drive offers a convenient system for transporting data (also see the "Other Storage Options" sidebar).

All these drives deliver about 40 megabytes (a few as much as 50 megabytes) of storage — today's best deal for an entry-level or supplemental hard-disk drive. Apple established 40 megabytes as the recommended hard-drive capacity for the Classic — that configuration (along with extra RAM) is the only alternative to the stripped Classic with just a floppy-disk drive.

Although some vendors might offer 20-megabyte drives at lower prices, 40-megabyte units cost less per megabyte. Also, most 40-megabyte drives contain newer technology than is found in smaller drives. That means that 40-megabyte drives are typically faster and more compact than smaller drives. Although larger hard-disk drives offer the same advantages, 40-megabyte drives remain the best choice for basic office computing on a tight budget.

Ins and Outs

A hard-disk drive can live in one of two places: inside or outside your Mac. An internal hard drive is aesthetically preferable — it hides in your Mac and leaves your desk clear.

For the Mac Classic, Apple's internal hard-disk drive is also a good buy: The official Apple upgrade for the Classic has a $500 list price. It provides a slow but reliable 40-megabyte

Status light: Many drive makers provide a disk-activity indicator LED on the front of their hard-disk drives so you can tell when the drive is busy. Often a power-status light is also provided, to let you know that your hard-disk drive is on.

Fan: Hard disks spin continuously while the drives are on, generating substantial heat. A fan helps keep the drive and its power supply cool. A replaceable air filter sometimes is used to prevent airborne dirt from collecting inside the drive assembly. Spinning fans can have sharp edges, so a protective grill or screen should be present.

Power supply: The hard-disk-drive mechanism needs DC power, converted from AC. Although some vendors rely on the power available from the Mac's external-floppy-drive port, an internal power-supply transformer is the most common solution. The ideal power-supply mechanism automatically switches between the standard U.S. (110 to 120 volts of AC) and European voltage ranges (220 to 240 volts of AC).

drive from Conner Peripherals along with an adapter board with an extra megabyte of RAM and two empty slots (for another 2 megabytes of RAM). That compares well with even the less expensive external drives that we tested (not to mention the $1,299 list price that Apple suggests for its *external* 40-megabyte drive — a fast Quantum). In other words, if you haven't yet bought your Classic and you know you'll want a 40-megabyte hard-disk drive, you're better off buying one built in by Apple — if you can put up with its poky performance.

On the other hand, an external drive provides benefits other than speed that compensate for its clutter and cables. If used as your Mac's primary (startup) or secondary hard-disk drive, it lets you take your files with you or lock them safely away at night. Just unplug the drive, and carry it away or stash it in a locked closet or cabinet.

External drives also serve as shared backup units — just (gently) pass the drive around the office and copy important files. An external SCSI drive also provides upward mobility: Plug the drive into your Plus today and then into your Mac IIfx after you win the lottery.

Good Connections

The Mac makes adding a hard-disk drive relatively easy. For each drive, you normally have two cables to connect (power and data), and — if your hard drive was properly designed — you have little chance of damaging your Mac, the drive, yourself, or your pride. Just make sure the power to every component is off before you start connecting things.

Because all Mac models use the same external SCSI hard-drive link, you can plug almost any Mac hard-disk drive into almost any Mac. Although SCSI connections can become complex if you start chaining several devices together (see the "SCSI Strategy" sidebar), a single hard-disk drive is unlikely to threaten your patience.

Once you've made your SCSI connection, you might need to install driver software for your hard-disk drive. Typically, a couple of mouse clicks in the vendor's formatting utility will have your hard-disk drive ready for normal use in a few minutes. All the hard-disk drives examined here came ready to run — preformatted and loaded with System 6.0.5. Hard-disk drives should now come equipped with System 6.0.7 (required for the Classic).

Naming Names

The name on the front panel of an external hard-disk drive tells you who assembled the unit — bringing together the hard-drive mechanism, a power supply, the case, the fan, and the electronic components. The overall quality of the drive — how much care went into its construction, how long it's guaranteed, what support to expect when something goes wrong — depends on this name.

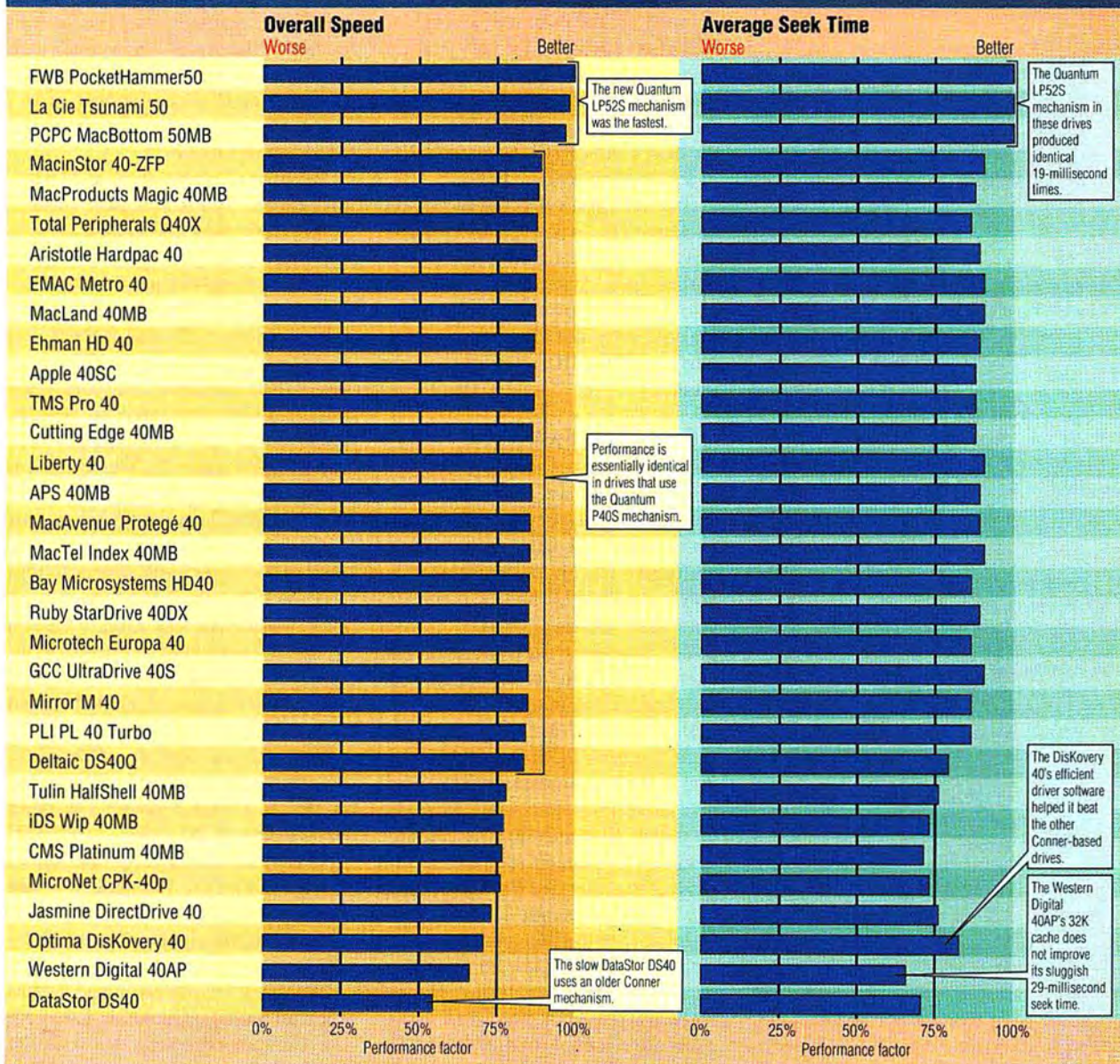
But if you look inside these 32 hard-disk drives, you'll find basic mechanisms from only a very few OEMs. The mechanism you'll find most often is the Quantum P40S, a fast and trouble-free performer. It has its own built-in 64K memory cache that isolates you and your Mac from most of the confusing details of fine-tuning your drive. For example, you have no worries about details such as setting the *interleave* (see Figure 2). The Quantum cache ensures that the P40S is optimally matched no matter what your Mac's interleaving requirements are. Four of MacUser Labs' seven Bottom Line picks — the EMAC Metro 40, GCC UltraDrive 40S, Liberty 40, and Microtech Europa 40 — use the Quantum P40S mechanism.

Quantum has also developed an even faster drive mechanism, the LP52S, which offers a capacity of about 50 megabytes; its improved performance comes at a higher price. The other three Bottom Line picks — the FWB PocketHammer50, PCPC MacBottom 50MB, and La Cie Tsunami 50 — use this mechanism.

Another mechanism favored by many vendors is the Conner CP3040. Although it's relatively quick, it can't keep up with the Quantum. One vendor, Computer Products, uses a similar but older version of this Conner mechanism in its DataStor DS40, which proved the slowest of all the drives reviewed.

Also slow was the Fujitsu M2611S mechanism that Jasmine chose for its DirectDrive 40, but the company claims that its product was optimized for reliability. Western Digital uses its own mechanism (the 1006VSCS); its 40AP drive also proved unexpectedly slow, in spite of its 32K memory cache.

Figure 1: Hard-Drive Performance



Overall Speed:

Overall speed is a composite of the results of three sets of tests: Average Seek Time, Data-Transfer Rate, and Real-World Performance. All the charts show how the drives stack up against the best performer in each test. A drive's speed depends on the make and model of its internal hard-disk mechanism and the *driver software* that manages its operation. As anticipated, performance of the tested drives was determined mostly by the basic mechanism and secondarily by the efficiency of the driver.

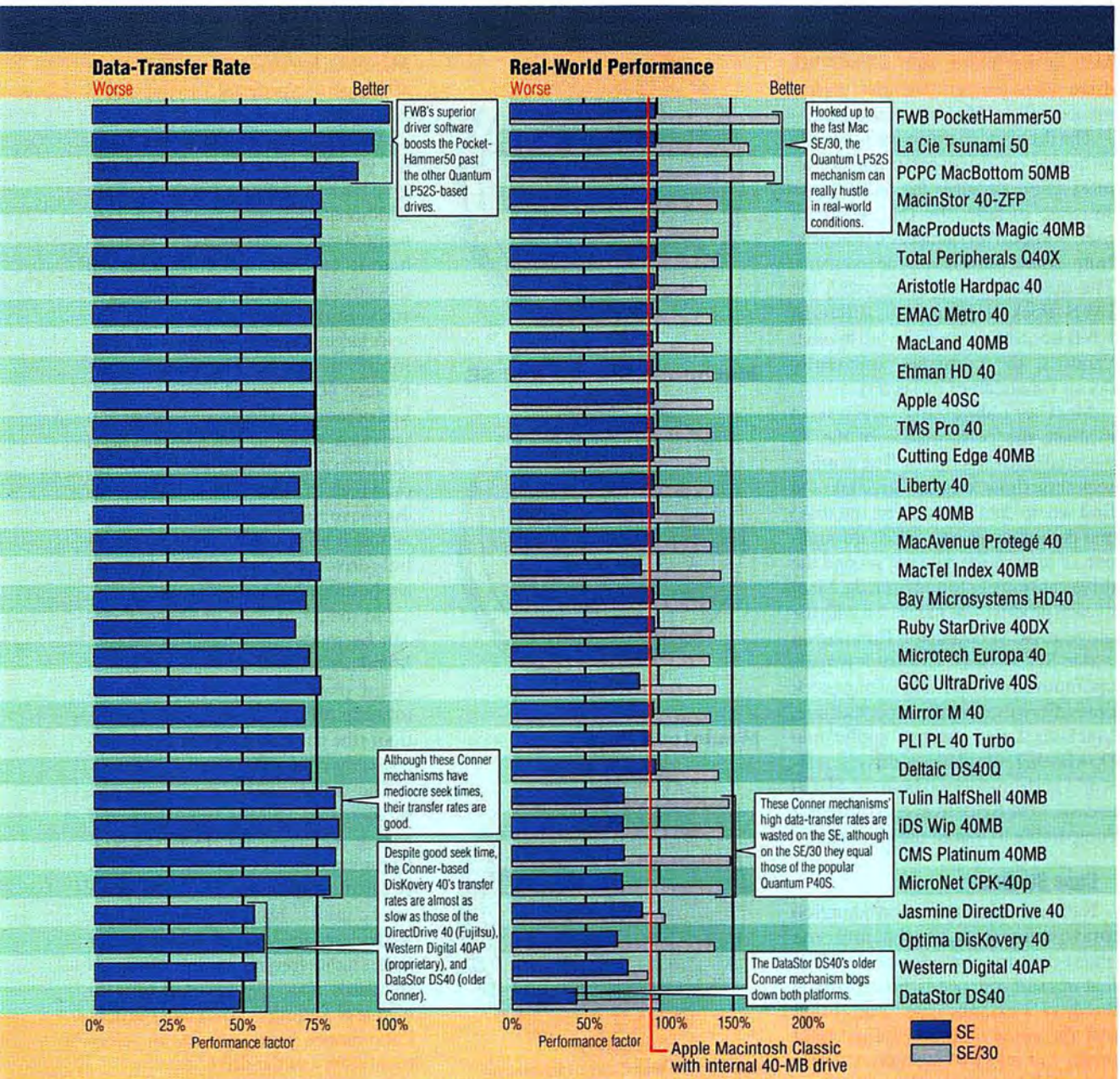
Average Seek Time:

There are many ways to measure how long it takes a hard-disk drive to find data — we use SCSI Evaluator, which provides one of the more conservative measures. The times claimed by vendors, along with the actual seek times recorded in our tests (ranging from 19 to 29 milliseconds), are listed in Table 2 at the end of this report.

Speed-upmanship

Speed is only one factor to consider when selecting a hard-disk drive for your Mac — and in most cases it's not even the most important. After all, any hard-disk drive can easily outrun the quickest floppy-disk drive — by a factor of 10. Buying the biggest, most expensive, fastest version of everything is a game of one-upmanship that's wasteful and misleading.

For example, not all Macs can take



Data-Transfer Rate:

We used SCSI Evaluator to test throughput rates while reading and writing data. No drive was significantly faster at one task than the other. This test reveals the raw throughput of the drive mechanism — more important for transferring large files than for repeated-access jobs.

Real-World Performance:

The MacUser Labs' DiskBasher benchmark writes and reads 10 megabytes of medium-sized files — giving an accurate simulation of real-world performance. When attached to a Macintosh SE (and, therefore, its near-twin, the Macintosh Classic), both Quantum mechanisms provide almost identical performance. The SE/30's fast SCSI port, however, can take advantage of the faster Quantum LP52S drive. The 40-megabyte Conner drive that is shipped in the Macintosh Classic is significantly slower than most drives.

advantage of the quickest drives. The SCSI circuitry of a Mac Classic, Plus, or SE, rather than the hard-disk drive itself, is the real data-throughput bottleneck. Check the Real-World Performance scores in Figure 1: With a Mac SE, overall performance of the tested drives is generally only about 70 percent of what's possible on an SE/30. If you have a Classic, Plus, or SE, it doesn't make sense to spend extra dollars for a drive that can prove its

worth only with a faster Mac. However, if you anticipate buying a faster Mac in the future, then a hard-disk drive with greater potential performance will justify its expense later.

The drive mechanism isn't the only influence on drive performance; almost as important is the SCSI-driver software installed by the vendor or user. Some drivers squeeze extra speed from some hard-drive mechanisms. The quickest driver comes with the FWB PocketHammer50. Although FWB licenses driver software to other vendors, the company apparently doesn't share all of its secrets.

MacUser Labs used several tests to evaluate the performance of the 32 external hard-disk drives. The average seek time (how long the drive takes to find where data is stored on the disk) and data-transfer rate (SCSI throughput, or how much data per second the drive can transfer to and from the Mac) of each product was measured with the program SCSI Evaluator. Running on a Mac SE/30, SCSI Evaluator reveals optimum throughput and average seek times. For a more realistic perspective, MacUser Labs' custom application DiskBasher simulates a drive's real-world performance on both the SE/30 and SE. (The SE delivers performance comparable to that of the Classic.)

Case Studies

Rather than limit your consideration to raw performance, you should choose a hard-disk drive based on how well its features suit your needs. First examine the drive's exterior case. You'll find that the cases of Mac external hard drives fall into two categories: "zero footprint" (drives that fit under one-piece Macs such as the Plus, SE, SE/30, and Classic) and everything else.

Slide a zero-footprint drive under your one-piece Mac, and you haven't wasted any work space on your desk. In addition, your Mac gains stature, putting its screen at a more favorable viewing angle.

Most zero-footprint cases were designed long ago and have flat faces to match the original Mac case. The first vendor to update drives to the rounded styling of the latest one-piece Mac is Microtech International, whose Europa 40 is a perfect pedestal for your curvaceous Mac Classic.

Among the cases that won't fit under your Mac Classic are several that give back in styling what they take in additional desk area. The La Cie Tsunami 50 uses a distinctive love-it-or-hate-it case designed for vertical placement by itself or for horizontal stacking of multiple drives (La Cie sells larger-capacity drives with zero-footprint cases). The MacAvenue Protegé 40 is shaped like a compact loaf of sandwich bread; its solid design provides good air circulation and a secure footing but not a handy platform on which to place a Mac. Other vendors have simply shrunk their products as much as possible. Their powerful little drives require less desk space and are portable but can cost more.

No matter the size or shape, cases can be made from metal or plastic. Metal has a sturdier feel, but even the stylish plastic cases are tough enough to shrug off a modest plummet to the floor (the paint on a metal case would probably chip off).

The better cases comply with the standards of various regulatory and testing agencies. The FCC (Federal Communications Commission) Class B certification indicates that a drive can be used in residential areas. Class A devices are verified under looser RFI (radio-frequency interference) standards and may be used only in business settings. An Underwriters Laboratories listing ensures the electrical safety of the drive.

Most drive vendors provide other electrical protection in the form of fuses to keep the drive safe from short circuits in the power supply. Drives that let you change the fuse without opening the case are preferable. If the fuse has done its job, someone will still need to open the drive to fix any underlying problem, but sometimes fuses simply die of old age and an easily accessible fuse is a welcome convenience.

Macintosh SE/30



Macintosh Classic and SE



Macintosh Plus



Figure 2: The Mac Plus (3:1 interleave) makes a hard-disk drive play some serious hopscotch — sending the data from one sector and then skipping the next three until the Mac can accept more information. Newer mechanisms such as the Quantum P40S and LP52S employ a memory cache to hold large chunks of data as the drive reads it from disk — they are always set to an interleave of 1:1. The cache automatically adjusts for the lower rate of data throughput that some Macs require. When formatting a hard disk, use the vendor's recommended software and interleave setting.

Other Storage Options

An external hard-disk drive is not your only option when you need more storage for your Mac. A broad array of technologies is available — each type with advantages and, of course, disadvantages.

Removable-hard-disk-cartridge drives (see "Portable Secure Unlimited-Storage Cartridge Drives," February '91, page 206) have the appeal of unlimited capacity. When you run out of space on one disk cartridge, you only have to replace it with another. Although cartridge drives make a perfect backup and data-exchange medium (with capacities of up to 45 megabytes), MacUser Labs doesn't recommend using them as your primary mass-storage system. The disk and drive mechanism are too exposed to the elements (conventional hard-disk drives are sealed), and cartridge drives are more vulnerable to impact and dust.

WORM (write once, read many) optical drives resemble erasable optical drives, but WORM technology only lets you write data. You can pile on the megabytes and then read it later, but you can never change what you've written. That makes a WORM drive an excellent choice for archival storage but not suitable for use as your primary mass-storage medium.

Erasable optical drives (also called magneto-optical) match CD-ROM's 600-megabyte capacities and data stability but let you read, write, and erase data. Unfortunately, these drives are costly (figure on $4,000 as the average entry fee) and a little slower than magnetic-hard-disk drives. Use erasable optical as primary or secondary storage, but have a compelling reason to spend this kind of money (see "Erasable Optical Drives," November '90, page 102).

Tape-cassette/cartridge drives (see "Getting It on Tape," December '89, page 189) are an excellent mass-storage option. But tape is a sequential, rather than random-access, medium — you can store megabytes or even gigabytes of data on tape, but you can't retrieve your data quickly. Tape has the advantages of high capacity and convenient transportability. Tape drives are used most frequently for routine backup of much faster storage systems, such as magnetic-hard-disk drives.

Power to the Product

Most computer peripherals use 120-volt alternating current (AC), which they then convert to lower-voltage direct current (DC). You plug the device's cord and the Mac's into a wall outlet (or preferably a reliable surge/spike protector), and your local utility takes care of everything else. With external hard-disk drives, however, electrical power can be delivered in one of three ways: conventionally (via an AC plug in the drive's rear panel), through a separate transformer "brick," or from your Mac's external-floppy-drive connector.

In the case of conventional power, a power-supply transformer built in to the drive case converts the local utility's AC power into the low-voltage DC required by the hard-drive mechanism. An external brick accomplishes the same thing outside the drive case. The brick has advantages. It keeps a major source of heat out of the case, and one less thing inside the case means the drive can be smaller. A power brick also makes the manufacturer's job easier — and sometimes cheaper. On the other hand, though, how portable is a drive if you must take along a separate power brick?

Other disadvantages are that a brick is something else to trip over, and something else to lose. Bricks are not easy to service; if the brick breaks, you must buy a new one (but the drive won't need to be opened). Also, keep in mind that a power-supply brick stays on and draws a little current even when the drive is off. Furthermore, bricks generally don't have replaceable fuses.

If you plan to travel extensively with your hard-disk drive, you might want one that operates with both standard American utility current (110 to 120 volts AC, 60 hertz) and the higher voltages in Europe and elsewhere around the world (220 to 240 volts AC, 50 hertz).

Aristotle and iDS sidestep the question of a power supply by pulling electricity through the external-floppy-drive connector on your Mac. As with external bricks, this strategy helps keeps the drive cool and its case small. It also saves the manufacturer (and, hopefully, you) the cost of the power supply or brick. But when a hard-disk drive takes over your external-floppy-drive connector, you can't add a second floppy-disk drive to your Mac. Any hard-disk drive that gets power from a floppy-drive port can't be used with the new Mac LC, because that Mac doesn't have a port for an external floppy-disk drive. Aristotle Industries solves this problem for its Hardpac 40, which is normally powered through the floppy-drive port, by offering an optional power-supply brick.

With the Mac Classic, the floppy-drive power issues are even more complex. Apple equips the Classic with a minimal — although highly reliable — power supply, so the Classic relies on a special power-up sequence. When you turn on a Classic, the computer first powers up, and then, following a one-second delay, the internal hard-disk drive (if the Mac has one) requires a huge initial surge of current to spin up the disk. The external-floppy-drive port of the Classic isn't part of this prioritized startup procedure. Consequently, a hard-disk drive connected to the Classic's external-floppy port might overload the system, either preventing it from booting up reliably or reducing its potential life span. Avoid floppy-connector-powered hard drives if you have a Classic.

SCSI Uncertainties

The seemingly straightforward task of plugging in a SCSI cable is sometimes complicated by connections to the external hard-disk drive. All Macs, as well as the portable Aristotle and La Cie drives, use 25-pin connectors, whereas most drives use shielded 50-pin connectors. The latter are better than 25-pin connectors, because they have a ground wire to each active line on the SCSI bus (the multiple-wire pathway found in SCSI cables and connectors); this helps ensure reliable

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40mb	$299	$389
52	329	429
105	399	499
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120	599	699
170	729	829
210	859	959

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173	Half Height	999	1099
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300mb		1249	1449
330	(RUNNER)	1499	1699
425	Half Height	1899	1999
600		1699	1899
630		2199	2399
1 Gig		2999	3399

- Quantum & Maxtor 200 Internal Drives fit Mac II/IIX/SE/SE30/Cx/Ci/Fx
- Conner & Maxtor 40 and 80 Internal drives fit Mac IISi/LC and Classic
- WREN Internal Drives fit Mac II/IIX/IIFx

MAXTOR 15 - 17ms Access

Capacity		Internal	External
40	Low Profile, fits LC, Classic & Si too!	$299	$399
80	Low Profile, fits LC, Classic & Si too!	429	529
200		859	959

Conner 25ms Access

40	Low Profile, fits LC, Classic & Si too!	$319	Internal Configurations Only
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600/Teac 155	2699
600/SyQuest	2599
300/Teac 155	2049
300/Syquest	1999
330/Teac 155	2399
330/SyQuest	2399

- All Tape Combo's Include one cassette and Retrospect!
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A SCSI Strategy

Connecting SCSI devices isn't difficult — but getting them all to work can be. The best approach is to follow the SCSI rules and, if that doesn't work, to bend them a little. The SCSI specifications let you connect up to seven devices to your Mac. One of those seven may be an internal hard-disk drive, or all seven may be external devices, such as scanners, tape drives, and CD-ROM drives.

All SCSI devices connected to a Mac are daisy-chained together. A cable leads from your Mac to the first device, then another cable connects the first device to the second, and so on. The two limits on chaining are a maximum of eight devices (including the Mac itself and any internal SCSI device) and a maximum chain length of 18 feet.

Because all the devices are connected in a single chain, your Mac looks for a unique SCSI-ID number as an address when it sends commands and data to an attached device. Without individual IDs, none of the SCSI devices can operate correctly.

SCSI ID 7 is reserved for the Mac itself. By convention (and usually with a permanent hardware adjustment), an internal hard-disk drive is installed with ID number 0 — the first SCSI ID that the computer checks for an available System Folder (if no floppy drive can provide one) when the Mac starts up. External drives are normally allowed to use the ID 0, which would conflict with any internal drive. (Note that the SCSI ID has nothing to do with the relative position of a SCSI device in the daisy chain.)

The SCSI daisy chain must be terminated at both ends. A terminator is a set of resistors, electronic components that absorb current. Terminators absorb signals at the ends of the daisy chain so that they don't bounce back down the line and interfere with other signals.

Each terminator also reduces the voltage of the signal and draws current from each SCSI device. If you connect too many terminators to a SCSI chain, the voltage may be reduced so much that signals become unreliable or the chain may draw so much current that it overloads and damages your Mac's circuitry.

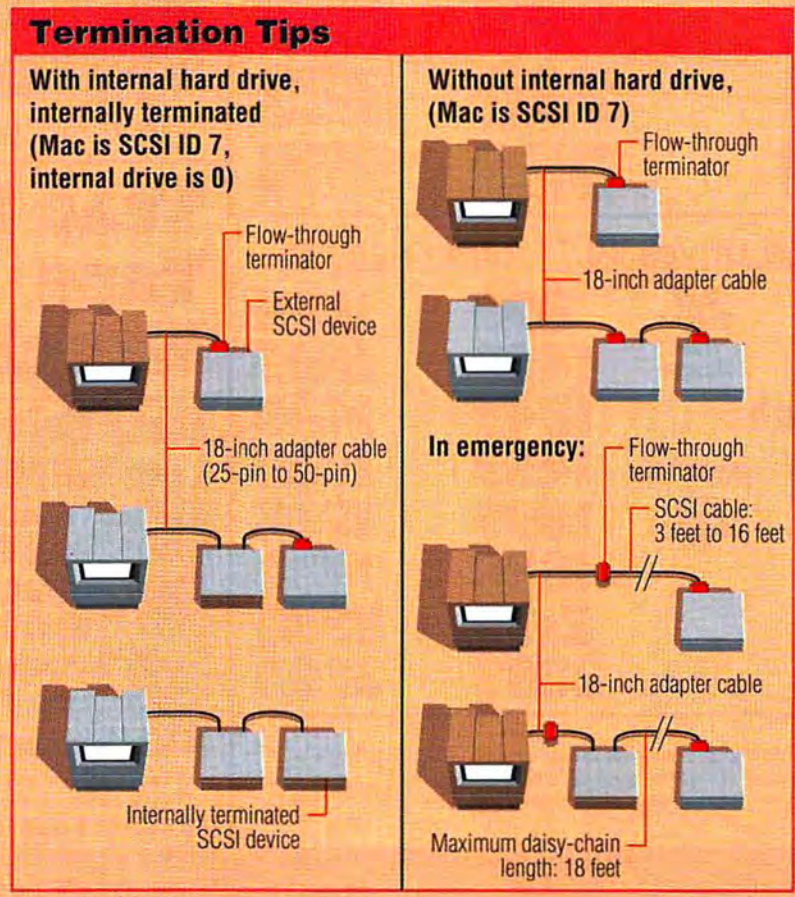
To terminate your SCSI chain properly, add a terminator only to the first and last devices in the chain (an internal hard-disk drive has a terminator). All devices in the middle of the chain should have termination removed or disabled.

Occasionally, one or more devices in the SCSI chain might not mount on your Mac's desktop. First, check that all the devices have unique ID numbers and are correctly terminated. Be sure to use matched SCSI cables that conform to ANSI (American National Standards Institute) specifications; a frequent problem is impedance mismatch among cables from different vendors.

If things still don't work, then it's time to experiment. First turn off the Mac and then all the devices in the daisy chain. Rearranging your SCSI cables to new positions in the chain may alter where signal reflections occur and allow all your SCSI devices to work.

If playing musical cables isn't successful, connect the SCSI devices in a different sequence (properly terminated). Ensure that each SCSI device is functional by disconnecting from the chain all the other devices or at least enough devices to isolate problem devices. Also try moving the SCSI terminator at one end of the chain to a few other positions, or try adding a third terminator in the middle of the chain. You should *never* have more than three terminators in a chain.

Termination Tips



operation — particularly when many SCSI devices are daisy-chained.

The MacProducts Magic 40MB includes two 50-pin SCSI connectors, but the connectors are unshielded plastic rather than the sturdy metal of all the other drives' connectors. Plastic is not only flimsier than metal but it's also unable to shield against electromagnetic interference, which can let signal noise scramble your data. The Magic 40MB we tested also lacked the clips necessary to keep the SCSI cable from slipping off, but MacProducts assured us that all of its drives now ship with clips and that the company will upgrade the clipless models for free.

Most external hard-disk drives have two SCSI connectors to allow daisy-chaining. Of the vendors whose drives we tested, only Liberty Systems had the ingenuity to find room for two 50-pin connectors on a drive package that you can fit easily into your parka pocket. In the continuing quest for miniaturization, the drives from Tulin and iDS omit one of the connectors on their products, sacrificing expansibility for size. You can put one of these single-connector drives at the end of your daisy chain, but your flexibility is limited and you can't connect two such drives to your Mac.

External drives usually include one 25-pin SCSI cable. Typically, this cable has a 25-pin connector on one end to match up with your Mac and a 50-pin connector at the other end to connect with most drives. If you already have SCSI devices attached to your Mac, you'll probably need a different cable, generally one with two 50-pin connectors. If you can choose what type of cable to receive when you order your drive, be sure to specify the correct configuration, including whether male or female connectors are needed.

Cable length is important. If you're daisy-chaining several drives, long cables can be a problem, because SCSI specifications limit the length of the entire daisy chain to 18 feet. If your daisy chain gets complex (see the "SCSI Strategy" sidebar), you'll find it helpful to have many cable lengths.

The PCPC MacBottom 50MB comes with one SCSI cable permanently attached to its case, which reduces your options when connecting the drive in a daisy chain but makes installing a single hard-disk drive straightforward. This drive includes a second SCSI connector for daisy-chaining.

In addition to providing conventional fuse protection against short circuits, the EMAC Metro 40 includes SCSI Sentry hardware to monitor and protect the delicate components dedicated to SCSI circuitry.

Meet the Terminator

Any series of SCSI devices (including the Mac itself) requires *termination*, which regulates electrical signals in the cable. External hard-disk drives use either internal or external methods for terminating daisy chains. An external terminator looks like a SCSI connector with no cable attached. It's easy to use and also easy to lose.

Internal termination can take several forms. Typically, there's a set of resistor packs on the hard-drive mechanism inside the case. Some manufacturers — Tulin and Aristotle, for example — give you no termination options. That's an acceptable scheme only for single-connector drives that you can't chain but that must be terminated.

Ehman, Cutting Edge, and Jasmine provide easy access to their internal terminations; you just open an access hatch and pull off the resistor packs when you don't need termination. However, the termination resistors are easy to misplace (a problem when you want to plug them in again) or to break during removal.

For these reasons, we prefer internal terminations that can be turned on and off externally. La Cie includes an external switch, and the PLI drive has a bank of 18 DIP switches for this purpose. The Western Digital 40AP uses a rotary switch that lets you choose terminated or nonterminated operation as well as its SCSI-ID number, but there's no label to tell you which position does what.

A Better ID

Every SCSI drive needs a way to change its SCSI-ID number in a chain of connected devices. Again, drive

On the Horizon

As files get bigger and performance demands increase, data-storage devices will get faster, smaller, less expensive, and more reliable. The design and manufacture of everything from large-capacity hard-disk drives down to floppy drives is being improved. At the same time, new storage technologies are emerging.

Apple's introduction of the "high-volume" (rhymes with "cheaper") Mac Classic, LC, and IIsi has prompted many third-party vendors of external hard-disk drives to redesign their products. Storage Dimensions is adding several new slim-line, zero-footprint drives of different capacities and has cut the prices of its line of hard-disk-drive subsystems.

Quantum, Seagate, and Conner are introducing smaller hard-drive mechanisms that need less power but deliver higher capacity and better performance. The low-profile 50-megabyte Quantum LP52S (used by the three fastest drives in this report) typifies this trend.

External hard-disk drives of roughly 40-megabyte capacity represent an inexpensive entry-level purchase, but 80- to 100-megabyte drives look attractive when you calculate the cost per megabyte. The next wave of low-cost disk mechanisms will hold approximately 100 megabytes; unsold products based on older 80-megabyte mechanisms should drop in price. Read mail-order and retailer ads before satisfying yourself with 40 megabytes of memory.

High-priced hardware still makes erasable optical technology (see "Erasable Optical Drives," November '90, page 102) less attractive than magnetic hard drives or cartridge drives. However, optical-drive prices are coming down in price. If you expect your long-term storage needs to require more than 600 megabytes, then the high reliability and low cost per megabyte of erasable optical drives makes them a worthwhile investment — if you don't mind their slightly slower performance.

Sony, Kodak, and JVC are developing CD-ROM drives that can write data once to specially designed 600-megabyte discs, after which they perform like conventional CD-ROM discs.

Hard-disk-drive manufacturer Micropolis will soon give Mac users a taste of RAID — "redundant arrays of inexpensive disks." RAID increases both performance and reliability by using several disks to read and write data. The hardware and software involved protect against the failure of any individual disk drive ("mirroring" does this too, but it doesn't boost performance).

— Bruce Mewhinney

Hidden Dangers

The worst you can expect from a badly designed hard-disk drive is poor performance, right? Wrong. As we discovered, seemingly innocuous details can lead to potentially disastrous consequences.

The POWERDrive 40MB from HDI (Hard Drives International) that we tested was fast and affordable, but it had one fatal flaw: Its SCSI connectors were so small that you could install the SCSI cable *upside down*. The resulting scrambling of voltages could disable not only the POWERDrive 40MB but also your Mac's sensitive circuitry. What's more, the drive's undersized connectors were made of unshielded plastic rather than the sturdy metal of the other drives' connectors. Without shielding, electromagnetic interference can garble your data.

Fortunately, HDI is now shipping a totally new POWERDrive 40MB. Although it arrived too late to be tested, the new POWERDrive 40MB is attractive and sturdily built and includes most of the features we recommend in small-capacity hard-disk drives. If it's as fast as the original POWERDrive 40MB — which was one of the fastest we tested — the second-generation POWERDrive 40MB (at the same low price of $359 as the old model) is well worth a look.

If you're one of the unlucky few who purchased an original POWERDrive 40MB, HDI will replace your old drive with a new, spiffy model at no charge (other than shipping). Just call the company at (800) 488-0004 for information about its replacement program.

And be sure you inspect the SCSI connectors of any low-cost drive you're considering — it might not be the bargain it seems to be.

— Rik Myslewski



The new HDI POWERDrive 40MB (bottom) not only solves problems found in the old model but it's built better as well. The old POWERDrive 40MB (top) has flimsy plastic SCSI ports that let you install a SCSI cable *upside down*.

vendors use several strategies. The best method is to use rotary thumb wheels and push-button switches that are plainly labeled. With the drive turned off, just adjust the switch until you reach the appropriate number.

SCSI-ID switches should give you a selection range of 0 through 6; 0 is used by external drives only when the Mac has no internal hard-disk drive (the Mac is always ID 7). ID switches with impossible-to-use, higher-number options (7, 8, or 9) let you travel into the Twilight Zone — where you're not sure what default ID the drive is using.

Lower on our list of recommended SCSI-ID-setting schemes are the DIP switches used by APS and La Cie — especially La Cie's, because the drive lacks an explanatory label. Although DIP switches are handy and effective, the lack of a label leaves you guessing which position of the switch is on and which is off, as well as what pattern to use for each ID setting.

For most users, the least desirable way to set SCSI IDs is with software — the method used by the MacProducts Magic 40MB. With software-selectable IDs, you can't tell what number is assigned to a drive by looking on its case. Instead, you must run a program to peek at the ID — and if the ID of the drive you're checking conflicts with that of another drive in your SCSI setup, you might corrupt data on both drives.

Drives with software-selectable IDs are safest when used with a Mac that has no internal hard-disk drive. To check or select the SCSI ID on such a drive, first connect the (terminated) external drive all by itself to the Mac. Then insert a floppy that contains only a System Folder and the drive vendor's SCSI-management utility. Turn on the hard-disk drive and then the Mac, and you'll be able to change the SCSI ID of the hard-disk drive.

Software and Service

Many of the hard-disk drives reviewed here seem similar enough that price might be considered their only distinguishing characteristic — but there are other important differences. All these products come equipped with their own driver software that matches the disk format to your Mac. The drivers differ not only in speed and performance but also in the methods used to set up and run the drive. Vendors frequently also bundle drive-formatting software from third-party developers.

Look closely, and you'll find that the different vendors use only a handful of drivers and formatters. The formatter from FWB is easy to use but has one potentially disastrous flaw: It doesn't keep you from inadvertently formatting your startup drive! A better approach is to use a separate startup floppy. FWB plans to release a revised version of its software to correct this problem. La Cie's Silverlining is a powerful formatter — it even has built-in timing loops that determine the optimum installation settings — but it's not intuitive to use.

Several vendors use On-Track Computer Systems' Disk Manager, which is unremarkable except for its ability to choose software-selectable SCSI IDs (in drives that allow this method). MicroNet's driver is easy to use, incorporates built-in diagnostic functions, and can be used with larger-capacity drives.

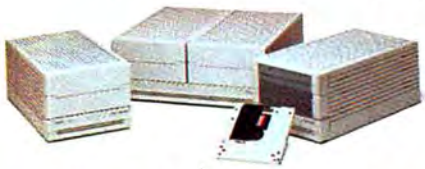
Vendors' customer-service policies vary widely (see Table 1). If your local dealer can't provide repairs or software assistance, look for special long-term programs from vendors. Some, such as Apple, sell contracts that simply extend their warranties. CMS

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Enhancements' ANDT (Absolutely No Down Time) program guarantees shipment of a replacement drive via priority overnight air-freight delivery. Microtech International offers an attractive Step Up trade-in program for older drives — even those from other vendors.

Above and beyond their driver software, hard-disk drives often come with handy utilities. EMAC and La Cie include the powerful Norton Utilities for the Macintosh. Jasmine and CMS Enhancements give you SUM II (Symantec Utilities for Macintosh). Among other features, these programs offer file-defragmenting and disk-optimizing features.

Vendors often include the popular utilities SCSI Probe and SCSI Tools (which are also available from Zmac and other on-line services). Some vendors pack their drives with megabytes of public-domain software and shareware — 14 megabytes' worth come with the Jasmine DirectDrive 40 and the MacTel Index 40MB. If you decide to keep the shareware programs, you must pay the registration fees, but these programs are a great way to test what's inexpensively available for your Mac.

Hard Choices Made Easy

If you're using a Mac without the benefit of a hard-disk drive, you're making your life unnecessarily difficult. Your storage space is limited, and your work creeps along at a snail's pace. Now that files and applications are growing, 40 megabytes of memory isn't a luxury — it's a necessity.

If you own a Mac Plus or a floppy-disk-drive-only SE (and you can find some great used-Mac buys as users upgrade to more powerful models), read the "Bottom Line" sidebar to find our picks among the 32 small hard-disk drives we tested. And if you're considering buying a Mac Classic, think seriously about buying one of the drives we recommend instead of opting for the 40-megabyte Conner mechanism that Apple bundles in the $1,499 version of its low-priced gem (the Classic minus hard drive lists for $999). Although you won't save a lot of money — Apple, for once, offers the hard-disk drive and memory-upgrade Classic option at a very reasonable price — you will gain a faster drive that, being external, can easily tag along as you move up the Mac's evolutionary ladder.

Along with this article and his previous blockbuster "101 Hard Drives: Buyer's Guide" (February '90), Winn L. Rosch offers all-purpose computer knowledge in *The Winn Rosch Hardware Bible*.

The Bottom Line

In a closely matched field of 32 contenders, one drive stood out as both the best performing and the best designed: the **FWB PocketHammer50** ($895). One of three drives equipped with Quantum's fast new LP52S mechanism, the PocketHammer50 has a compact metal case that is sturdy and well finished. It includes external SCSI termination, push-button SCSI-ID selection, and an external fuse. FWB provides great software for managing software partitions, backup, and formatting (but be careful — it doesn't prevent you from accidentally formatting your startup volume).

Two other Quantum LP52S-equipped drives, the **La Cie Tsunami 50** ($649) and **PCPC MacBottom 50MB** ($399), finished a strong second and third in our speed tests. On the plus side, the MacBottom 50MB's fan blows cooling air up through a Mac Classic's fan vent, and the La Cie Tsunami 50 has space-age styling that is either sexy or silly, depending on your taste. However, both score lower than the PocketHammer50 in other areas: Both have 25-pin SCSI connectors, and the MacBottom 50MB has an undetachable SCSI cable that's a mixed blessing — idiotproof but limiting. However, the MacBottom's low, low price makes its failings forgivable.

A total of 21 drives use the fast and familiar Quantum P40S mechanism — and their speed is virtually identical. Construction quality, features, software, warranty, price, and solid company reputations for stability and service separate the **EMAC Metro 40** ($799), **GCC UltraDrive 40S** ($679), **Liberty 40** ($699), and **Microtech Europa 40** ($569) from the crowd.

The Metro 40 includes an external switch that configures the drive for optimum Mac Plus compatibility; styling that complements Apple's; the SCSI Sentry feature, which guards against problems with the SCSI circuitry; a front power switch; and either vertical or horizontal orientation. Unfortunately, its SCSI-ID switch allows settings up to 9.

The UltraDrive 40S, Liberty 40, and Europa 40 all offer good performance, solid construction, and all the right features at attractive prices. The UltraDrive 40S and Europa 40 are elegant and are backed by experienced vendors with long histories of reliable service. The Liberty 40's unique feature is its small size, which — along with its attractive carrying case — makes it a popular choice for folks who lug data from Mac to Mac. It includes two 50-pin SCSI connectors, auto-sensing (U.S. or overseas) AC power, and a thumb-wheel SCSI-ID selector. Its internal SCSI termination, however, is difficult to disable.



Seven entry-level drives live up to our high expectations: (clockwise from top) the FWB PocketHammer50, La Cie Tsunami 50, Liberty 40, Microtech Europa 40, GCC UltraDrive 40S, EMAC Metro 40, and PCPC MacBottom 50MB.



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Table 1: Service and Support

	Standard warranty	Extended warranty	Money-back guarantee	Toll-free support	Service center	Guaranteed turnaround	Data recovery
Apple 40SC	1 year	AppleCare program	none	no	dealer	none	no
APS 40MB	2 years	none	30 days	yes	direct	48 hours	$75/hour
Aristotle Hardpac 40	1 year	none	30 days	no	direct	1 week	no
Bay Microsystems HD40	1 year	none	none	no	direct	none (claim 24-hour average)	$75/hour
CMS Platinum 40MB	1 year	$99 for add'l year*	none	no	direct or dealer	none (claim 48-hour average)	no
Cutting Edge 40MB	2 years	none	30 days	no	dealer	none	no
DataStor DS40	1 year	none	30 days	yes	direct	24 hours	no
Deltaic DS40Q	1 year	none	30 days	yes	direct	48 hours	yes
Ehman HD 40	2 years	$20 for add'l year†	30 days	no	direct	72 hours	no
EMAC Metro 40	2 years	none	none	no	direct or dealer	none (claim 72-hour average)	no
FWB PocketHammer50	1 year	$72 for add'l year	none	no	direct	48 hours	yes
GCC UltraDrive 40S	2 years	none	30 days	yes	direct or dealer	none	yes
iDS Wip 40MB	2 years	$119 for 5 years§	none	yes	dealer	none	no
Jasmine DirectDrive 40	2 years	$120 for 5 years◊	30 days	no	direct	3 – 5 days	no
La Cie Tsunami 50	5 years	none	none	yes	direct	48 hours	$60/hour
Liberty 40	2 years	none	30 days	no	direct	36 hours	yes
MacAvenue Protegé 40	2 years**	none	30 days	yes	direct	72 hours	no
MacinStor 40-ZFP	2 years	price not yet set	none	no	direct or dealer	48 hours	no
MacLand 40MB	2 years	none	30 days	yes	direct	48 hours	yes
MacProducts Magic 40MB	2 years††	none	30 days	no	direct	none (claim 95-hour average)	yes
MacTel Index 40MB	2 years§§	none	none	no	direct	24 hours	yes
MicroNet CPK-40p	1 year	$195 for add'l year	30 days	no	dealer	48 hours	no
Microtech Europa 40	1 year	none	lifetime	yes	direct or dealer	48 hours	yes
Mirror M 40	2 years◊◊	***	30 days	no	direct	none	yes
Optima DisKovery 40	1 year	$100 for 3 years	30 days	no	dealer	24 hours	no
PCPC MacBottom 50MB	2 years	none	none	no	direct	none	yes
PLI PL 40 Turbo	1 year	$63/year, max. 3 years	30 days	yes	direct or dealer	none (claim 48-hour average)	yes
Ruby StarDrive 40DX	1 year	none	30 days	yes	direct	none	yes
TMS Pro 40	2 years	none	30 days	yes	direct	48 hours	yes
Total Peripherals Q40X	2 years	none	none	no	dealer	72 hours	yes
Tulin HalfShell 40MB	1 year	price not yet set	none	no	direct or dealer	48 hours	$50/hour
Western Digital 40AP	1 year	none	none	yes	direct	none (claim within a month)	no

*ANDT (Absolutely No Down Time) program ($249): In addition to honoring your extended warranty, CMS will ship you a drive in less than 24 hours.

†EESP (Ehman Extended Service Program): Ehman will send you a new drive within 24 hours.

§You can purchase the extended warranty up to 90 days after your purchase.

◊You can purchase the extended warranty up to 90 days after your purchase, but you will receive a 20-percent discount if you buy the extended warranty at the time of purchase.

**If something goes wrong within 90 days, MacAvenue will ship a new drive overnight and pay for return shipping of the broken drive.

††Advanced Replacement Policy ($50 covers the two-year warranty): If your drive goes down, MacProducts will send you a drive within 24 hours.

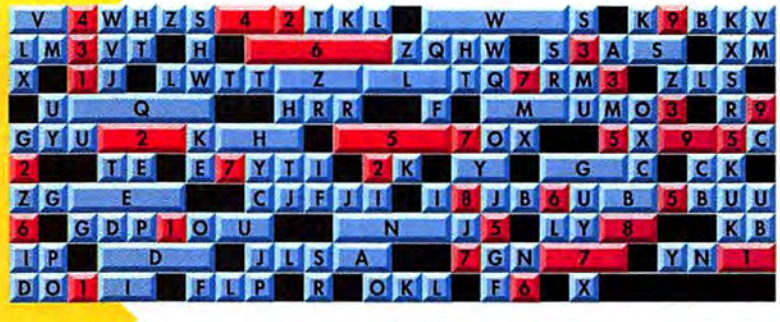
§§MacTel will service the drive for the first 30 days, but then you must take the drive to Quantum for warranty service.

◊◊DriveCare: Mirror repairs not only its drives but its competitors' as well. Mirror has a 90-percent success rate for recovering crashed data.

***$47 for one additional year, $89 for two additional years, and $126 for three additional years.

This is your hard disk severely fragmented

This is how a typical fragmented hard disk looks. The abuse fragmentation can deal is a crime, and it's causing a national epidemic in offices everywhere. But the more you use your computer, the more your files are spread all over your hard disk. As a result, your disk has to work a whole lot harder than it has to. And increased head movement not only slows down your file access times, it will slow you down, too.



This is your hard disk defragmented

Even defragmentation software can't help much. Wimpy defraggers just place pieces of individual files adjacent to each other. Defraggers just don't have the intelligence to constantly monitor your file useage. So, any increases in performance are modest and only temporary, disappearing as soon as you use your computer again.



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Only DiskExpress II has revolutionary Disk Optimatic™ technology designed to safely keep your disk optimized forever. And only DiskExpress II has the intelligence to work transparently while you work, the way you work. Which means only DiskExpress II can monitor your daily file activity and determine the absolute optimum priority for file placement on your particular computer. Frequently used files are placed first, then free space and then seldom used files at the back of your disk where they belong. That not only minimizes head movement, it delivers the kind of mind-boggling increase in speed and performance you could get hooked on and be better off for it. To order your new DiskExpress II 2.04, call ALSoft today.



■ *Frequently used files* ■ *Seldom used files* ■ *Free space*

Numbers & Letters are scattered pieces of single files

Any Questions?



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Table 2: Features of Small Hard Drives

❍ = yes ● = no	Apple 40SC ♦♦♦♦	APS 40MB ♦♦♦½	Aristotle Hardpac 40 ♦♦♦	Bay Microsystems HD40 ♦♦♦	CMS Platinum 40MB ♦♦♦½
Price (list/street)	$1,299/$959	$399 direct	$595 direct	$430 direct	$919/$610
Pros	Solid construction. Handsome design.	Inexpensive. Large collection of shareware.	Compact. Inexpensive.	Inexpensive.	Auto-sensing power supply.
Cons	Most expensive.	Internal termination.	25-pin SCSI connectors. Floppy-port power (not advisable for Classic).	Minimal software. Plain case is not sturdy.	Expensive. Slow. Plain metal case.
Capacity (advertised/actual)	40/39.3 MB	40/40.3 MB	40/40.2 MB	40/40.3 MB	40/40.3 MB
Average seek time, milliseconds(ad./actual)	19/21 ms	12/21 ms	19/21 ms	19/22 ms	24/26 ms
Technology					
Internal mechanism	Quantum P40S	Quantum P40S	Quantum P40S	Quantum P40S	Conner CP3040 v. 2.24
Automatic head parking	yes	yes	yes	yes	yes
SCSI-ID selector	thumb wheel	DIP switch	rotary switch	rotary switch	push button
SCSI termination	external	internal	internal	internal	internal
SCSI cable	2 ft, 50/25-pin	3 ft, 50/25-pin	3 ft, 25/25-pin	2 ft, 50/25-pin	6.5 ft, 50/25-pin
Software					
SCSI driver	HD SC Setup	Powertools 1.13	Disk Manager 2.02	Pro Driver 1.2	CMS utility v. 6.0
Bundled	Disk First Aid	12 MB of shareware	1.2 MB of shareware	none	SUM II
Selectable interleave	❍*	❍*	❍*	❍*	●
Partitioning	●	●	●	❍	●
Password protection	●	●	●	❍	●
Data encryption	❍	❍	●	❍	●
Disk optimizer	❍	❍	❍	❍	●
Backup	●	❍	❍	❍	●
File recovery	❍	❍	❍	❍	●
Case					
Fan	●	●	not required	●	●
Indicator lights	access	access, power	access	access, power	access
Outlets	none	none	not required	none	none
Size (L x W x H, in.)	9.5 x 10 x 3†	10.5 x 10 x 3†	7 x 5 x 2	10 x 10 x 2.5†	10.5 x 10 x 2†
Weight	7.3 lb	6 lb	2.2 lb	5 lb	4 lb
Case construction	plastic	metal	plastic	plastic	metal
Auto-switchpower supply	85 – 270V	90 – 240V	optional	90 – 250V	100 – 240V
Fuse (internal/external)	internal	internal	internal	external	internal
	Apple Computer 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	Alliance Peripheral Systems 2900 S. 291 Hwy. Independence, MO 64057 (800) 233-7550	Aristotle Industries 7033 Antrim Ave. Burnaby, BC Z5J 4M5 Canada (604) 434-7274	Bay Microsystems 210 Columbus Ave., #108 San Francisco, CA 94133 (415) 563-8392	CMS Enhancements 2722 Michelson Dr. Irvine, CA 92715 (714) 222-6000

*Quantum mechanism uses only 1:1 interleave.

†Zero footprint on one-piece Mac.

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Table 2: Features of Small Hard Drives, continued

❍ = yes ● = no	Cutting Edge 40MB 𝄞𝄞𝄞½	DataStor DS40 𝄞𝄞	Deltaic DS40Q 𝄞𝄞𝄞	Ehman HD 40 𝄞𝄞𝄞𝄞	EMAC Metro 40 𝄞𝄞𝄞𝄞½
Price (list/street)	$799/$435	$339 direct	$449 direct	$429 direct	$799/$470
Pros	2 extra AC plugs. Clear access panel allows view of SCSI termination.	Least expensive.	Inexpensive. Low profile.	Inexpensive. 2 extra AC plugs. Same SCSI setup as Cutting Edge drive.	Vertical or horizontal orientation. SCSI Sentry protection. Front power switch.
Cons	Exposed fan opening on underside of case.	Slowest drive tested. Case is not sturdy. SCSI-ID switch allows 7 – 9.	SCSI-ID switch allows 7 – 9. Pressure on power cord causes fan rattle.	Exposed fan opening on underside of case.	SCSI-ID switch allows 7 – 9.
Capacity (advertised/actual)	42/40.2 MB	42/40.2 MB	40/40.3 MB	40/40.2 MB	40/40.3 MB
Average seek time, milliseconds (ad./actual)	19/21 ms	29/27 ms	19/24 ms	19/21 ms	19/21 ms
Technology					
Internal mechanism	Quantum P40S	Conner CP340 v. 0608	Quantum P40S	Quantum P40S	Quantum P40S
Automatic head parking	yes	yes	yes	yes	yes
SCSI-ID selector	push button	thumb wheel	push button	push button	push button
SCSI termination	internal	internal	external	internal	external
SCSI cable	2 ft, 50/25-pin	2 ft, 50/25-pin	2 ft, 50/25-pin	2 ft, 50/25-pin	2 ft, 50/25-pin
Software					
SCSI driver	proprietary	H. D. Formatter 1.2	Deltaic Installer 2.01	proprietary	EMAC Disk Utility 3.31
Bundled	none	none	none	proprietary	Norton Utilities
Selectable interleave	❍*	●	❍*	❍*	❍*
Partitioning	●	●	❍	●	●
Password protection	❍	❍	❍	❍	●
Data encryption	❍	❍	❍	❍	❍
Disk optimizer	❍	❍	❍	❍	●
Backup	●	❍	❍	●	❍
File recovery	❍	❍	❍	❍	●
Case					
Fan	●	●	●	●	●
Indicator lights	access, power	access, power	access, power	access, power	access, power
Outlets	2 (switched)	none	none	2 (switched)	none
Size (L x W x H, in.)	10.5 x 10 x 2.5†	10 x 10 x 2.5†	10 x 10 x 2.5†	10.5 x 10 x 2.5†	10.5 x 10 x 3†
Weight	5.8 lb	6 lb	6 lb	5.8 lb	6 lb
Case construction	metal	plastic	metal	metal	plastic
Auto-switch power supply	90 – 270V	none	90 – 240V	90 – 270V	90 – 260V
Fuse (internal/external)	external	external	external	external	external
	Cutting Edge 97 S. Red Willow Rd. Evanston, WY 82930 (307) 789-0582	Computer Products Corp. 4657 MacArthur Ln. Boulder, CO 80301 (800) 338-4273	Deltaic Systems 1701 Junction Ct. Suite 302B San Jose, CA 95112 (800) 745-1240 (408) 441-1240	Ehman Engineering P.O. Box 2126 Evanston, WY 82930 (800) 257-1666	EMAC (Everex Systems) 48431 Milmont Dr. Fremont, CA 94530 (800) 821-0806, ext. 2155

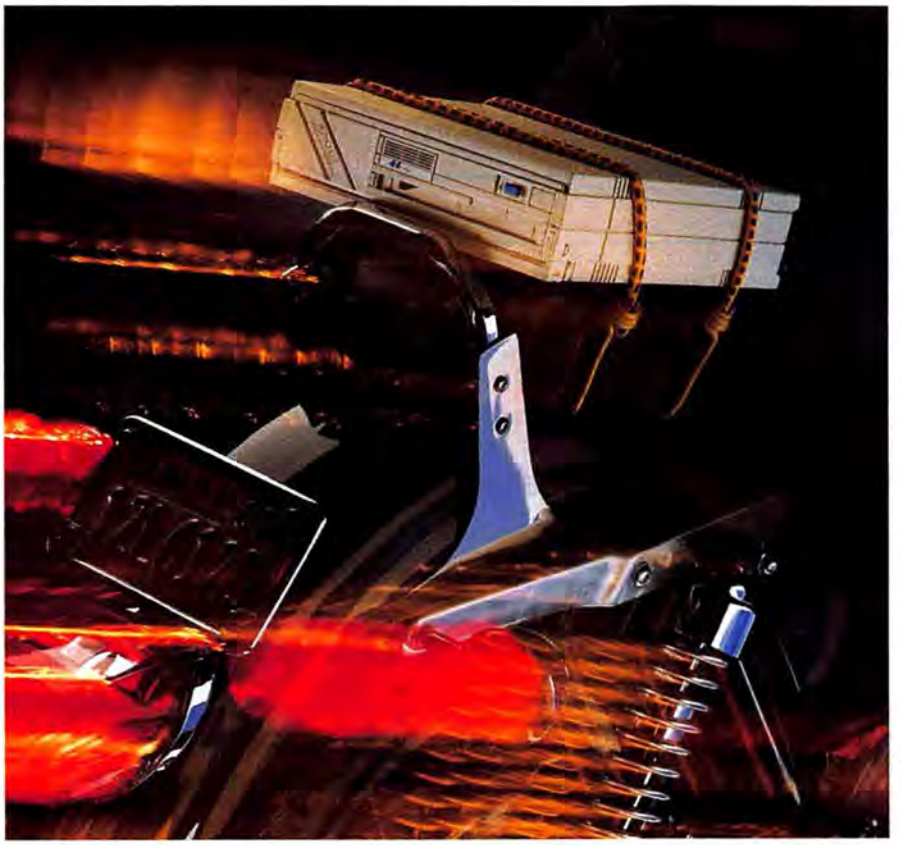
*Quantum mechanism uses only 1:1 interleave.

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Media Reliability		
Media Warranty	*5 yrs.*	*2 yrs.*
Drop Height	*8 ft.*	*2.5 ft.*
Non-operating Shock	*1,000Gs*	*100Gs*
Performance		
Effective Access Time	*22 msec.*	*20 msec.*
Transfer Rate	*8-12 Mbits/sec.*	*4.8 Mbits/sec.*
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Small File Dup. (many)	*82 sec.*	*174 sec.*
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Table 2: Features of Small Hard Drives, continued

❍ = yes ● = no	FWB PocketHammer50 $4\frac{1}{2}$	GCC UltraDrive 40S $4\frac{1}{2}$	iDS Wip 40MB 4	Jasmine DirectDrive 40 $3\frac{1}{2}$	La Cie Tsunami 50 $4\frac{1}{2}$
Price (list/street)	$895/$720	$679/$647	$529/$499	$399 direct	$649 direct
Pros	Fastest overall. Compact, solidly built. Speedy, portable, durable.	Good software. Solid construction. Status lights easily visible. Security loop.	Compact, lightweight. Good shareware.	Inexpensive. 2 extra AC plugs. Low profile. Good documentation.	Second-fastest overall. Good software. Vertical or horizontal orientation.
Cons	Expensive. Current software allows format of startup drive.	No AC outlets.	Slow. Single SCSI port. Floppy-port power (not advisable for Classic).	Slow. SCSI-ID switch allows 7 – 9.	25-pin SCSI connectors. DIP switches unlabeled.
Capacity (advertised/actual)	50/50.2 MB	40/40.2 MB	40/40.2 MB	40/43.2 MB	50/49.9 MB
Average seek time, milliseconds (ad./actual)	17/19 ms	19/21 ms	25/26 ms	25/25 ms	15/19 ms
Technology					
Internal mechanism	Quantum LP52S	Quantum P40S	Conner CP3040 v. 2.24	Fujitsu M2611S	Quantum LP52S
Automatic head parking	yes	yes	yes	yes	yes
SCSI-ID selector	push button	push button	rotary switch	push button	DIP switch
SCSI termination	external	external	internal	internal	internal
SCSI cable	2 ft, 50/25-pin	2 ft, 50/25-pin	2 ft, 50/25-pin	2 ft, 50/25-pin	2 ft, 25/25-pin
Software					
SCSI driver	H. D. Formatter 1.3	Drive Manager 6.13	iDS Express 1.3	DriveWare 1.71	Silverlining 5.27/11
Bundled	HD Partition, Deadbolt, Util	QuickEnvelope, QuickSpool II, SUM II, 3.5 MB of shareware	proprietary, 10 MB of shareware	proprietary, SUM II, 10 MB of shareware	Silverlining, Norton Utilities 5 MB of shareware
Selectable interleave	❍*	❍*	●	❍	❍*
Partitioning	●	●	❍	●	●
Password protection	●	●	❍	●	●
Data encryption	●	●	❍	●	❍
Disk optimizer	❍	●	●	●	●
Backup	●	●	●	❍	❍
File recovery	❍	●	❍	●	●
Case					
Fan	●	●	❍	●	●
Indicator lights	access, power	access, power	access	access, power	access, power
Outlets	none	none	none	2 (switched)	1 (nonswitched)
Size (L x W x H, in.)	8.5 x 3 x 6.5	11 x 9.5 x 2.5†	8 x 5 x 1.5	10.5 x 9.5 x 2†	8.5 x 6 x 2.5
Weight	3 lb	6.6 lb	1.5 lb	4 lb	2.65 lb
Case construction	metal	plastic	plastic	plastic	plastic
Auto-switch power supply	90 – 240V	90 – 240V	NA	90 – 260V	110 – 220V
Fuse (internal/external)	external	internal	internal	external	internal
	FWB, Inc. 2040 Polk St. Suite 215 San Francisco, CA 94109 (415) 474-8055	GCC Technologies 580 Winter St. Waltham, MA 02154 (800) 422-7777 (617) 890-0880	iDS Systems, Inc. 2107 N. First St. Suite 280 San Jose, CA 95131 (800) 733-0078 (408) 752-2952	Jasmine Technologies 1225 Elko Dr. Sunnyvale, CA 94087 (800) 347-3228	La Cie, Ltd. 19552 S.W. 90th Ct. Tualatin, OR 97062 (800) 999-0143 (503) 691-0771

*Quantum mechanism uses only 1:1 interleave.

†Zero footprint on one-piece Mac.

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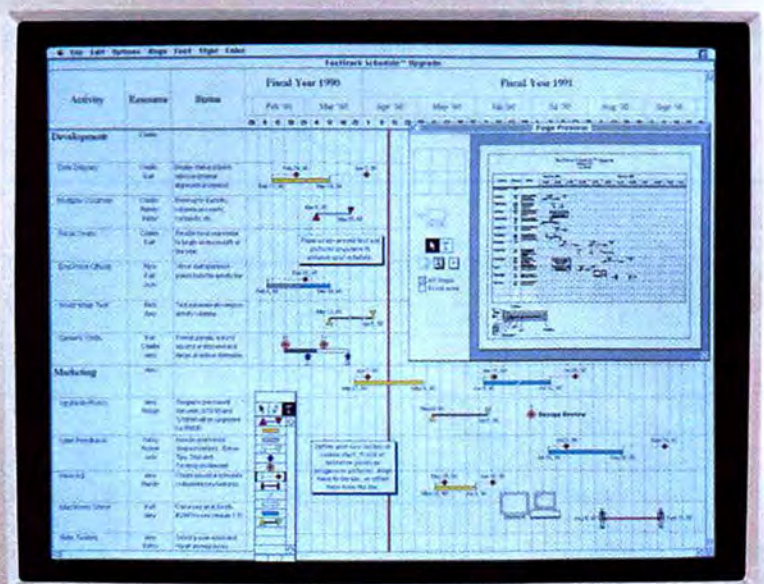
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Table 2: Features of Small Hard Drives, continued

❍ = yes ● = no	Liberty 40 $$$$½	MacAvenue Protegé 40 $$$$½	MacInStor 40-ZFP $$$$	MacLand 40MB $$$	MacProducts Magic 40MB $½
Price (list/street)	$699 direct	$455 direct	$979/$649	$399 direct	$409 direct
Pros	Moderate price for well-designed totable.	Inexpensive. 2 extra AC plugs. Good ventilation. Solid construction.	Good formatting software. Low profile. Elegant.	Inexpensive.	Inexpensive.
Cons	Internal termination difficult to disable.	Bulky. Neither zero-footprint nor vertical.	Flexible case. Moderately expensive.	SCSI-ID switch allows 7 – 9.	Unshielded plastic SCSI connectors. Software SCSI-ID selection.
Capacity (advertised/actual)	40/40.3 MB	40/40.2 MB	40/40.2 MB	40/40.2 MB	40/40.2 MB
Average seek time, milliseconds (ad./actual)	12/21 ms	19/21 ms	19/21 ms	19/21 ms	19/21 ms
Technology					
Internal mechanism	Quantum P40S	Quantum P40S	Quantum P40S	Quantum P40S	Quantum P40S
Automatic head parking	yes	yes	yes	yes	yes
SCSI-ID selector	thumb wheel	push wheel	push button	thumb wheel	software
SCSI termination	internal	external	external	internal	external
SCSI cable	3 ft, 50/25-pin	2 ft, 50/25-pin	2 ft, 50/25-pin	2 ft, 50/25-pin	3 ft, 50/25-pin
Software					
SCSI driver	Liberty Formatter 2.0	DiskMaster	MacinStor Installer 3.0	MacLand Smart Software	Disk Manager Mac 2.23
Bundled	none	On Location	proprietary	Smart Format, Format Partition, Smart Image, Smart Restore	Disk Manager Mac 2.23 11 MB of shareware
Selectable interleave	❍*	❍*	❍*	❍*	❍*
Partitioning	●	●	●	●; A/UX, $39	●
Password protection	●	●	●	❍	●
Data encryption	❍	❍	❍	❍	❍
Disk optimizer	❍	❍	●	❍	❍
Backup	●	❍	●	●	●
File recovery	❍	❍	❍	❍	❍
Case					
Fan	❍	●	●	●	●
Indicator lights	access, power	access, power	access, power	access, power	access, power
Outlets	none	1 (nonswitched)	none	none	none
Size (L x W x H, in.)	7 x 2 x 5	9.5 x 5 x 4.5	11 x 10 x 3†	10 x 10 x 2.5†	11 x 10 x 2.5†
Weight	3 lb	6.5 lb	5.5 lb	5.9 lb	6 lb
Case construction	metal	plastic	plastic	plastic	metal
Auto-switch power supply	90 – 300V	none	110 – 220V	110 – 220V	115 – 230V
Fuse (internal/external)	internal	external	internal	external	internal
	Liberty Systems 122 Saratoga Ave. Suite 16 Santa Clara, CA 95051 (408) 983-1127	MacAvenue 12303 Technology Blvd. Austin, TX 78727 (800) 777-4326	Storage Dimensions 2145 Hamilton Ave. San Jose, CA 95125 (408) 879-0300	MacLand 4685 S. Ash St. Suite H-5 Tempe, AZ 85282 (800) 333-3353	MacProducts USA 8303 Mopac Expy. Suite 218 Austin, TX 78759 (800) 622-3475 (512) 343-9441

*Quantum mechanism uses only 1:1 interleave.

†Zero footprint on one-piece Mac.

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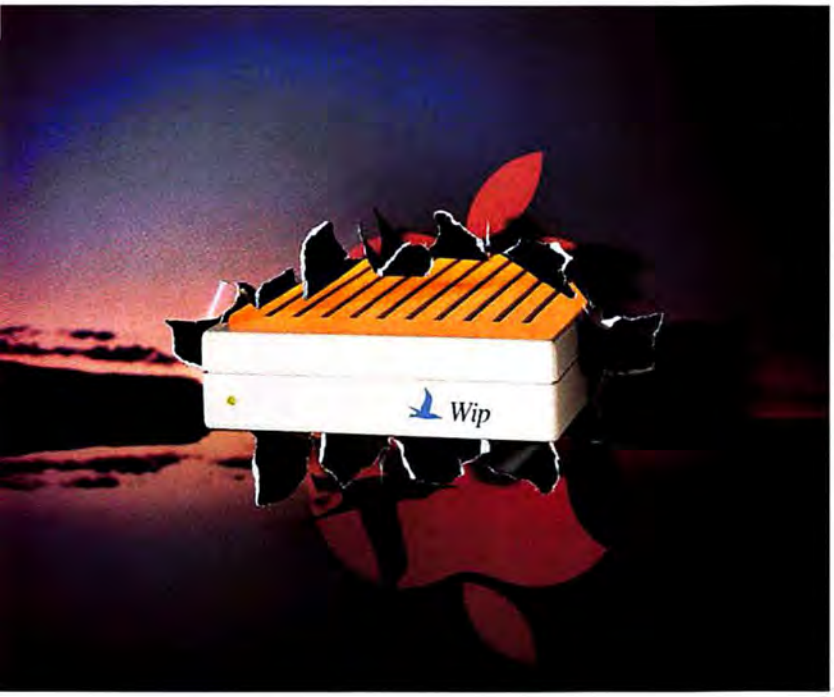


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Table 2: Features of Small Hard Drives, continued

❍ = yes ● = no	MacTel Index 40MB $$$½	MicroNet CPK-40p $$$$	Microtech Europa 40 $$$$½	Mirror M 40 $$$$	Optima DisKovery 40 $$$$
Price (list/street)	$439 direct	$825/$529	$569/$484	$457 direct	$695/$444
Pros	Inexpensive. 2 extra AC plugs. Solid construction. Low profile.	Powerful software. Well ventilated. Compact.	Good value for moderate price. Elegant case. Step-Up trade-in plan. 5-year warranty.	2 extra AC outlets. Solid construction. Low profile.	Distinctive case design. Vertical or horizontal orientation.
Cons	Unswitched outlets.	Slow.	Limited software.	Heavy. SCSI-ID switch allows 7 – 9.	Slow. SCSI-ID switch allows 7 – 9. Not zero-footprint.
Capacity (advertised/actual)	40/40.3 MB	40/40.3 MB	40/40.2 MB	42/40.2 MB	40/40.2 MB
Average seek time, milliseconds (ad./actual)	19/21 ms	25/26 ms	19/22 ms	19/22 ms	25/23 ms
Technology					
Internal mechanism	Quantum P40S	Conner CP3040 v. 2.24	Quantum P40S	Quantum P40S	Conner CP3040 v. 2.24
Automatic head parking	yes	yes	yes	yes	yes
SCSI-ID selector	push button	push button	push button	push button	push button
SCSI termination	internal	external	internal	external	external
SCSI cable	3 ft, 50/25-pin	3 ft, 50/25-pin	2.5 ft, 50/25-pin	1 ft, 50/25-pin	2 ft, 50/25-pin
Software					
SCSI driver	FWB/HD Chauffeur	MicroNet Utility 4.4	Europa Formatter 3.26	Media Manager v. 1.33	DiskMount 2.0
Bundled	Backmatic 1.1, AutoSave II, 14 MB of shareware	none	Apple System	DiskTop, QuicKeys Lite, Media Manager, 11 MB of shareware	none
Selectable interleave	❍*	●	●	❍*	●
Partitioning	●	●	●	●	●
Password protection	●	●	❍	●	●
Data encryption	●	❍	❍	❍	❍
Disk optimizer	❍	❍	❍	❍	❍
Backup	●	❍	❍	●	❍
File recovery	●	❍	❍	❍	❍
Case					
Fan	●	❍	●	●	●
Indicator lights	access, power	access, power	access, power	access, power	access, power, termination
Outlets	2 (nonswitched)	none	none	2 (switched)	none
Size (L x W x H, in.)	10 x 10 x 2.5†	8 x 6 x 2.5	10.5 x 9.5 x 2.5	11 x 10 x 2†	10 x 11.5 x 2.5†
Weight	5.5 lb	3 lb	6.6 lb	11 lb	9 lb
Case construction	metal	plastic	plastic	metal	plastic
Auto-switch power supply	90 – 240V	90 – 260V	110 – 220V	96 – 240V	90 – 260V AC, 47 – 440 Hz
Fuse (internal/external)	external	internal	external	external	internal
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*Quantum mechanism uses only 1:1 interleave.

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Disk functions	.6	1.29
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170 MB hard drive	$828	$939
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1.2 gig hard drive	na	$2795

Internal kit $29

Magic 45R MacUser ★★★★

Magic 45 MB Removable $499

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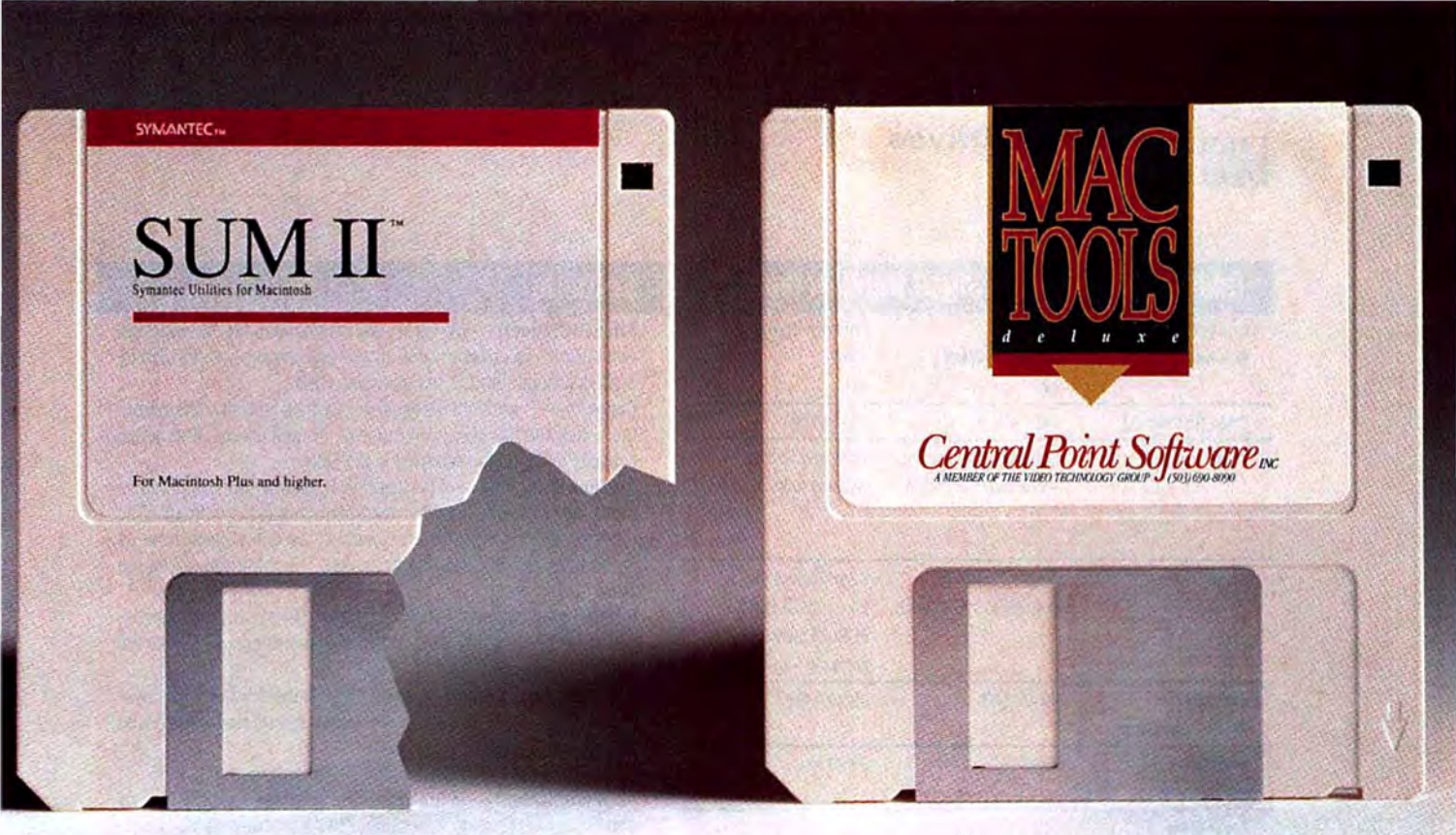
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Table 2: Features of Small Hard Drives, continued

❍ = yes ● = no	PCPC MacBottom 50MB $$$$½	PLI PL 40 Turbo $$$$	Ruby StarDrive 40DX $$$½	TMS Pro 40 $$$	Total Peripherals Q40X $$$
Price (list/street)	$399 direct	$629/$549	$799/$550	$389 direct	$529/$525
Pros	Third-fastest overall. Low profile. Good fan design for Mac Classic use. Very inexpensive.	Ext. SCSI termination switch (DIP). Low profile. Good construction.	Extra AC outlet. Solid construction. Low profile.	Inexpensive. Plain case design is somewhat flexible.	Metal case.
Cons	Single 25-pin SCSI port and 1 hard-wired cable. SCSI-ID switch allows 7 – 9.	DIP switches unlabeled.	Heavy. Internally terminated. SCSI-ID switch allows 7 – 9.	SCSI-ID switch allows 7 – 9.	25-pin SCSI connectors. (Should now be shipping with two 50-pin connectors.)
Capacity (advertised/actual)	50/48.2 MB	40/40.2 MB	40/40.3 MB	40/40.3 MB	40/40.2 MB
Average seek time, milliseconds (ad./actual)	15/19 ms	19/22 ms	19/21 ms	19/21 ms	19/22 ms
Technology					
Internal mechanism	Quantum LP52S	Quantum P40S	Quantum P40S	Quantum P40S	Quantum P40S
Automatic head parking	yes	yes	yes	yes	yes
SCSI-ID selector	push button	rotary dial	push button	thumb wheel	push button, software
SCSI termination	internal	external	internal	internal	internal
SCSI cable	2 ft, 25-pin (attached)	2 ft, 50/25-pin	3 ft, 50/25-pin	2 ft, 50/25-pin	2 ft, 25/25-pin
Software					
SCSI driver	SCSI Tools 2.1.5	PLI Formatter 3.0	Nuvo Labs 1.12	STI Formatter 1.2	TPI Disk Manager 1.01
Bundled	demos of Nisus, Synchronicity, C.A.T.	9 MB of shareware	none	proprietary, 8 MB of shareware	none
Selectable interleave	❍*	❍*	❍*	❍*	❍*
Partitioning	●	●	●	❍	●
Password protection	●	❍	●	❍	❍
Data encryption	●	❍	❍	❍	❍
Disk optimizer	❍	●	❍	❍	❍
Backup	●	●	●	❍	❍
File recovery	●	❍	❍	❍	❍
Case					
Fan	●	●	●	●	●
Indicator lights	access, power	access	access, power	access, power	access
Outlets	none	none	1 (switched)	none	none
Size (L x W x H, in.)	9.5 x 9.5 x 2†	10 x 9.5 x 2.5†	10.5 x 10 x 2†	10 x 10 x 2.5†	10.5 x 10 x 3†
Weight	4.5 lb	6 lb	12 lb	4 lb	10 lb
Case construction	plastic	metal	metal	plastic	metal
Auto-switch power supply	80 – 260V	none	120 – 230V	110 – 220V	90 – 260V
Fuse (internal/external)	internal	external	external	external	internal
	PCPC 4710 Eisenhower Blvd. Bldg. A4 Tampa, FL 33634 (800) 622-2888 (813) 884-3092	PLI 47421 Bayside Pkwy. Fremont, CA 94538 (800) 288-8754 (415) 657-2211	Ruby Systems, Inc. 930 Thompson Pl. Sunnyvale, CA 94086 (800) 888-1668	TMS Peripherals 23123 S.W. 58th Ave. Boca Raton, FL 33028 (800) 626-6347	Total Peripherals One Brigham St. Marlboro, MA 01752 (508) 480-8327

*Quantum mechanism uses only 1:1 interleave.

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Table 2: Features of Small Hard Drives

○ = yes ● = no	Tulin HalfShell 40MB ↕↕	Western Digital 40AP ↕↕½
Price (list/street)	$499 direct	$999/$700
Pros	Compact. Low profile. Inexpensive. Portable.	Compact. Solid. Security loop.
Cons	Single SCSI port. Difficult to set SCSI ID.	Slow. Expensive. 25-pin SCSI ports. SCSI-ID switch allows 7 – 9, A – F.
Capacity (advertised/actual)	40/40.3 MB	40/39.2 MB
Average seek time, milliseconds (ad./actual)	25/25 ms	29/29 ms
Technology		
Internal mechanism	Conner CP3040 v. 2.32	W.D. 1006VSCS
Automatic head parking	yes	yes
SCSI-ID selector	jumpers (on drive)	rotary switch
SCSI termination	internal or external	internal
SCSI cable	3 ft, 50/25-pin	2 ft, 50/25-pin
Software		
SCSI driver	Disk Manager Mac	WD Formatter 2.0.2
Bundled	none	proprietary, 2 MB shareware
Selectable interleave	●	○
Partitioning	●	○
Password protection	●	○
Data encryption	○	○
Disk optimizer	○	○
Backup	○	○
File recovery	○	○
Case		
Fan	○	●
Indicator lights	access	access, power, parked
Outlets	none	none
Size (L x W x H, in.)	7.5 x 5.5 x 1.5	8 x 7 x 3
Weight	2.25 lb	5 lb
Case construction	metal	plastic
Auto-switch powersupply	none	90 – 230V
Fuse (internal/external)	internal	internal
	Tulin Corp. 2156H O'Toole Ave. San Jose, CA 95131 (408) 432-9025	Western Digital 8105 Irvine Center Dr. Irvine, CA 92718 (714) 932-5000

Criteria

Price (list/street) — The list price is the manufacturer's suggested retail price. The street price is an average actual price charged by dealers around the U.S. in December 1990.

Capacity — The advertised capacity of a drive typically differs from the actual formatted capacity (useful storage space). The actual capacity listed is that reported in the Finder.

Average seek time — The theoretical average time required to move the read/write head between any two tracks on the disk (as reported by the manufacturer) versus the actual seek time as reported by our SCSI Evaluator testing. The lower the rating, the faster the drive.

Internal mechanism — The OEM model name of the disk mechanism used in the drive. Check with the vendor to see if the mechanism used varies.

Automatic head parking — When a Mac shuts down and its power is switched off, a hard-disk drive should move its read/write heads off the disk surface.

SCSI-ID selector — The method used to change the SCSI ID.

SCSI termination — Is the drive's termination inside the case or outside the case, using a terminator block or switches?

SCSI cable — The length of the SCSI cable and the types of connectors on each end.

SCSI driver — The software that manages a hard-disk drive.

Bundled — Commercial applications, utilities, or shareware that the vendors include with the drive along with software developed exclusively for their hard-disk drives.

Selectable interleave — Can the user specify the desired interleave ratio for the drive, or is it always automatically set by the software or the drive itself?

Partitioning — Does the drive come with the ability to divide one large physical drive into several smaller logical drives?

Password protection — Does the drive come with a method to prevent others from accessing it without a password?

Data encryption — Does the drive come with a method of scrambling its contents to prevent others from accessing the data without a password?

Disk optimizer — Does the drive come with a utility for reorganizing its contents into contiguous blocks to improve its performance?

Backup — Does the drive come with software that copies files from the hard-disk drive to another medium for safekeeping?

File recovery — Does the drive come with a utility for rescuing deleted or damaged files?

Fan — Does the drive contain a fan?

Indicator lights — What do the lights (if any) on the front of the drive indicate?

Outlets — A switched AC outlet allows you to control power to both the drive and another device by using the drive's on/off switch. A nonswitched outlet provides power even when the drive is turned off.

Size — The dimensions of the case, rounded to the nearest quarter of an inch.

Weight — The weight of the case, rounded to the nearest quarter of a pound.

Case construction — The primary material used for the case.

Auto-switch power supply — What voltage range does the drive's power supply automatically accept?

Fuse — Is the drive internally or externally fused?



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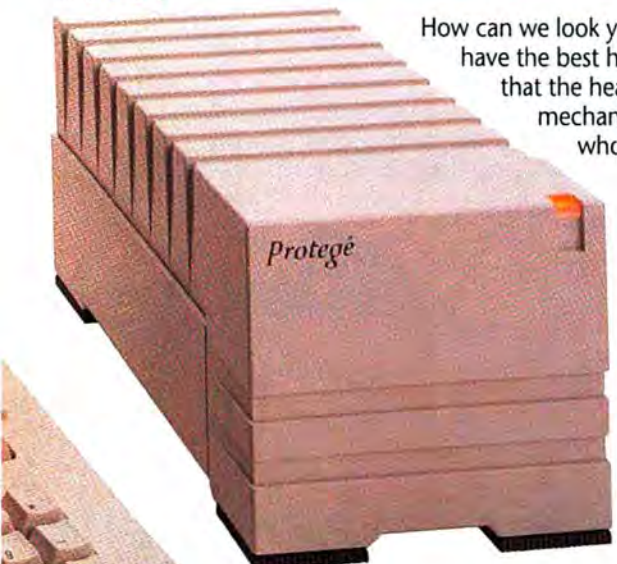
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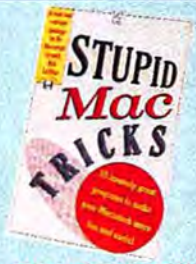
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Expand your system's expandability. Applied Engineering's easy-to-install **QuadraLink** lets you add four additional serial ports to your Macintosh. Includes a "shadow driver" so that all the new ports will be recognized by virtually all software.

QuadraLink (Applied Engineering). 26917 $205

KEYBOARDS, MICE, ETC.

Advanced Gravis		
ADB Mousestick	25286	$66
DataDesk		
Mac 101 Keyboard Platnm (Plus)	25185	$134
Mac-101 Keyboard, ADB	25180	$134
Mac-101 Keyboard Beige (Plus)	25181	$134
SWITCHBALL	25183	$98
SWITCHBOARD	25182	$159
Kensington		
Turbo Mouse ADB	25281	$107
Turbo Mouse Plus	25280	$107
MacAvenue		
101 Extended Keyboard ADB	25186	**$99**
MicroSpeed		
MacTrac (SE, II, IIgs)	25285	$75
Mouse Systems		
Little Mouse	25283	$75
Trackball ADB	25284	$69
Seiko		
DT3600 Digitizing Tablet	23734	$295

ACCESSORIES

American Power		
UPS 110SE	26292	$207
UPS 370ci	26294	$337
Applied Engineering		
QuadraLink	26917	$205
Bernoulli		
Bernoulli B33C 44MB Tape Cartridge	57804	$95
Calcomp		
WI2	26918	$157
Cover-Up		
Diskette Wallet 10pk (alligator)	26909	$7.50
Diskette Wallet 10pk (blue)	26910	$7.50
Diskette Wallet 3pk (alligator)	26911	$5.50
Diskette Wallet 3pk (blue)	26912	$5.50
Mac Plus KB Skin (81 Key)	25780	$14.95
Mac Plus KB Skin (w/ # Pad)	25781	$14.95
Mac SE/II 101 KB Skin	25782	$14.95
Mac Plus/SE Dust Cover	26894	$8
Fellowes		
Compact Personal Shredder PS 50	52655	$119
Inland		
3 Mode Surge Protector	40505	$14.50
InnovativeTechnology		
The Library (grey)	26903	$12
The Library (black)	26905	$12
Interex		
9 Pin Male to 9 Pin Male	26298	$7.95
Keyboard Replacement Cable, 3ft	26900	$7
Mac 128/512 to Hayes DB9 to 25pin, 6ft.	26281	$7
Mac 128/512 to Imgwrtr DB9 to 25pin	26282	$7
Mac to SCSI 25pin M to 50pin M 2ft	26280	$11
Mac to SCSI System Cable, 6ft	26290	$15
MacPlus Peripheral Adapter cable, 1ft	26283	$7
MacPlus, SE, II to Apple Modem	26284	$7
MacPlus, SE, II to Hayes DIN8 to 25pin	26285	$7
MacPlus,SE,II to Imgwrtr DIN8 to 25pin	26286	$7
MacPlus,SE,II to Imgwrtr II DIN8 to DIN8	26287	$7
Mini DIN-8 to Mini DIN-8 Null	26297	$7.95
SCSI Terminator, 50pin M/F Daisy-Chain	26295	$18
SCSI Terminator, 50pin male	26296	$18
Irwin Magnetics		
External Tape Back-Up 5040/60	23832	$529
External Tape Back-Up 5080/120	23833	$719
Kensington		
Apple RGB Anti-Glare Filter	26891	$62
Mac II Monitor Extended Kit	26899	$32
Mac II Monitor Stand	25580	$62
Mac II Stand and Cable Kit	26892	$63



A Better Network Manager

Technology Works' **GraceLAN** network management software profiles every device on your network without wearing out your blue suede shoes. Create a comprehensive report of software and hardware configurations, locate any conflicts and even find out which programs are used most often.

GraceLAN (Technology Works). 27750..$375

Kensington *(continued)*		
Mac II System Stand	26887	$20
Masterpiece Mac II	26893	$103
SE Anti-Glare Filter (beige)	26882	$32
SE Anti-Glare Filter (platinum)	26883	$32
Security Kit	26884	$33
System Saver Plus (beige)	26888	$62
System Saver Plus (platinum)	26907	$62
System Saver SE	26889	$62
Tilt/Swivel Monitor Stand	25582	$24
Universal Printer Stand	26896	$16.95
MacAvenue		
Fuji Rainbow Diskettes-1.44M DS/HD	47496	$15.95
Keyboard drawer	41753	$19
Teak 3.5 Double Rolltop Box (90)	41601	$29
Teak 3.5 Single Diskette Box (45)	41600	$17.99
Teak Keyboard Drawer	41752	$69
Pace		
MacAvenue Carrying Case	26898	$65
MacAvenue Carrying Case Extended Kybd	26901	$76
Sony		
3.5 Diskettes 1.44MB 10Pk	57440	$24.95
Sony 3.5 Diskettes 800KB 10Pk	57401	$13.95
Sophisticated Circuits		
PowerKey	25030	$64
Tripplite		
SpikeBar SK6-6	40510	$22

SOUND INTERFACES

Articulate Systems		
Voice Navigator II	23736	$649
Farallon Computing		
Hyperdialer	26886	$32
MacRecorder	23730	$158
Passport Designs		
MIDI Interface	23732	$76

Writing and Publishing

WORD PROCESSING, WRITING

Ashton-Tate		
FullWrite Professional v1.5	30601	$253
Claris		
MacWrite II v1.1	30586	$157
Microsoft		
Microsoft Word v4.0	30582	$245
Microsoft Write v1.0	30584	$77
Nolo Press		
WillMaker v4.0	29888	$34
WordPerfect		
WordPerfect Mac v2.0	30591	$234

PAGE LAYOUT PUBLISHING

Aldus		
PageMaker v4.0	29781	$497
Claris		
SmartForm Designer	29200	$291

UTILITIES FOR WRITERS/PUBLISHERS

DeltaPoint		
Taste	30638	$98
Lexpertise		
MacProof v3.2.1	30630	$115
Lifetree		
Correct Grammar v2.0	30633	$49
Reference Software		
Grammatik Mac v2.0	30634	$50

FONTS AND FONT UTILITIES

Adobe		
Adobe Plus Pack v1.0	29834	$119
Streamline v1.2	29268	$225
TypeAlign v1.0.4	29826	$58
TypeManager v2.0	29825	$57
Broderbund Software		
Typestyler	30450	$115



DayStar Gives You Top Speed

When you're ready for serious high-end performance — 40 Mhz speed — you need DayStar Digital's **PowerCache IIci**. Plug in this turbo-charged cache card and your IIci will be the fastest Mac alive, faster than even the IIfx.

PowerCache 40 MHz IIci with co-processor (DayStar). 23651..$1167

Business Software

INTEGRATED/BUNDLED APPLICATIONS

Microsoft		
Microsoft Works v2.0 w/ Quicken v1.5	30580	$199

ACCOUNTING/BOOKKEEPING

ChipSoft		
Turbo Tax	28500	$51
DAC		
Easy Light Checkbook Acctounting v2.0	28475	$41
Intuit		
Quicken v1.5	28458	$39
Meca		
Managing your Money v3.0	28463	$139
ProPlus		
Wall Sreet Investor	28494	$395
Reality Software		
WealthBuilder	28496	$145
Softsync		
Accountant Inc. Professional	28481	$345
SoftView		
if x: Personal Tax Analyst	28498	$47
MacInTax 1040 Federal 1990	28502	$61
Software Toolworks		
Dollars & Sense v5.0	28465	$86
Timeslips		
Timeslips III v2.0	28504	$196

DATA ANALYSIS AND PRESENTATION

Odesta		
Data Desk v3.0	27818	$458

DATABASE

Acius		
4th Dimension v2.1	27780	$489
File Force	27820	$247
Claris		
FileMaker Pro	27789	$216
Fox Software		
FoxBase + Mac v2.1	27791	$292



Hold a Conference via Macintosh

With Aspects, up to 16 Macs can be connected for a real-time, interactive conference. This *MacUser* Eddy award-winning program lets everyone write text, create graphics or add notes from their own files so everyone in the group will have the information immediately. Saves time and money by linking Macs from across the street or across the country.

Aspects (Group Technologies). 27746 $198

Lotus		
Marketplace	29904	$525
Microsoft		
Microsoft File v2.0A	27798	$123
MySoftware		
MyAdvanced MailList	27816	$27
Preferred Pubs		
Database	27834	$67
Sensible Software		
Bookends v1.2	27830	$50
Ventura		
Ventura Publisher v3.0	29906	$582

OFFICE PRODUCTIVITY PROGRAMS

Microsoft		
Microsoft Mail v2.0	30496	$85
Power Up		
Letter Writer Plus v1.0	30440	$54

SPREADSHEET PROGRAMS/TEMPLATES

Informix		
Wingz v1.1	30184	$245
Microsoft		
Microsoft Excel v2.2	30180	$245

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800-395-6221

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NEW MacAvenue Software Paks!



More Fun, Less Money

The **MacAvenue Fun Pak** includes 5 programs: Hitchhiker's Guide to the Galaxy, Leather Goddesses of Phobos, Crystal Quest, Solitaire Royale and Talking Moose. A $299 value!

Fun Pak 29400 $39.95

Make Life Better

The **MacAvenue Better Living Pak** gives you Dinner at Eight (including The Encore Edition and The Weeknight Gourmet), QuickLetter, Synchronicity and Protector Shark. Six packages worth more than $300!



Better Living Pak 29402 $49.95

Hardware

STORAGE DEVICES

Quantum		
40MB External Protegé	24390	$455
80MB External Protegé	24391	$645
105MB External Protegé	24392	$695
210MB External Protegé	24400	$995
40MB Internal - (IIcx,ci)	24191	$349
80MB Internal - (IIcx,ci)	24192	$549
105MB Internal - (IIcx,ci)	24193	$599
210MB Internal - (IIcx,ci)	24196	$945
40MB Internal - (SE-IIx)	24188	$349
80MB Internal - (SE-IIx)	24189	$549
105MB Internal - (SE-IIx)	24190	$599
210MB Internal - (SE-IIx)	24200	$945
Seagate		
20MB External Protegé	24380	$345
40MB External Protegé	24381	$395
80MB External Protegé	24382	$525
20MB Internal - (IIcx,ci)	24184	$295
40MB Internal - (IIcx,ci)	24185	$325
80MB Internal - (IIcx,ci)	24186	$465
20MB Internal - (SE-IIx)	24180	$295
40MB Internal - (SE-IIx)	24181	$325
80MB Internal - (SE-IIx)	24182	$465



PowerKey to Mac Success

Power up your entire system with the touch of a key and turn it off with "Shut Down" using **PowerKey** from Sophisticated Circuits. Your computer and three peripherals plug in to PowerKey's four surge-suppressed outlets and a cdev allows you to set up a timed on/off and macro schedule for unattended operation. Bundled with QuicKeys Light.

PowerKey (Sophisticated Circuits). 25030 .$64

Applied Engineering		
3.5 800K Floppy Drive	24735	$205
High-Density 3.5 1.44K Floppy Drive	24736	$239
Dayna Communications		
DaynaFile 1.2MB DF0200	24732	$550
DaynaFile 360K DF0100	24738	$519
DaynaFile 360K/1.2MB DF0102	24733	$725
DaynaFile 360K/1.44MB DF0104	24737	$745
Fujitsu		
800K Floppy Drive	24731	$99
Iomega		
Bernoulli 40-40	24384	$2195
Mac 1B Interface Kit	23834	$48
Portable 44MB	24385	$1429
Kennect Technology		
360K 5.25 Drive	24740	$299
Drive 2.4 (3.5)	24730	$325
MacAvenue		
Protegé HD Carrying Case	26908	$24

PRINTERS, SCANNERS AND FAXES

Adobe		
Postscript for LJ-II	38432	$299
Complete PC		
Complete Page Scanner	22753	$758
Dest		
Personal Scan w/ Recognize! Software	22762	$699
Digital Vision		
Computer Eyes B/W	22758	$196
Computer Eyes Color	22759	$344
Dove		
DoveFax-External	22701	$289
Epson		
ES-300C Color Scanner w/ I/F	22765	$1824
Kodak		
M150 Mac Portable	22855	$519
Logitech		
ScanMan 32	22751	$319
MicroTek-IMSI		
Microtek 300Z Color Scanner	22755	$1945
Orchid		
OrchidFAX Modem	22702	$449
Relisys		
Tefax RA2110	22700	$895
Seiko		
Label Printer	22852	$195
Labels for Seiko Label Printer	35623	$11.99
Texas Instruments		
17 Font microLaser w/ ATalk board	22856	$1595
17 Font microLaser XL w/ ATalk board	22858	$2795
35 Font microLaser w/ ATalk board	22851	$1795
35 Font microLaser XL w/ ATalk board	22859	$3095
Envelope Feeder	23056	$279
Legal Paper Tray	23057	$59
microLaser Toner Cartidge	38311	$46

COMMUNICATIONS-MODEM

Applied Engineering		
DataLink Express w/ MNP-5/Send Fax	22312	$239
DataLink/Mac w/ MNP-5/Send Fax options	22313	$275
Global Village		
Teleport Modem	22311	$134
Hayes		
Smartmodem 9600	49578	$899
MacAvenue		
2400 External w/o SW	49557	$119

COMMUNICATIONS-NETWORK

Asanté		
MacCon+ IIE thk/thn	22538	$395
MacCon+ IIET thk/UTP	22529	$395
MacCon+ SE30E thk/thn	22526	$395
MacCon+ SE30ET thk/UTP	22531	$395
MacCon+ SEE thk/thn	22525	$295
MacCon+ SEET thk/UTP	22532	$295
Dayna Communications		
EtherPrint	22541	$375
Farallon Computing		
Liason v3.0	27744	$259
PhoneNET Connector DB-9	22511	$31
PhoneNET Connector Din-8	22513	$31
PhoneNET Repeater	22517	$313
PhoneNET StarController	22516	$824
Portable Pack	22519	$329
MacAvenue		
Localtalk connector DB-9 to Din 3	22520	$32
Localtalk connector Din-8 to Din 3	22521	$32
Phone Connector DB-9	22522	$23
Phone Connector Din-8 w/ cable	22523	$25
Nuvotech		
Nuvolink II	22536	$279
Nuvolink SC	22535	$305
Shiva		
NetModem V.32 9600 baud	22528	$1425
NetSerial X232	22504	$275
Technology Works		
Mac II Ethernet Kit	22539	$275
Mac II/10t Ethernet Kit	22540	$275
Nodem (thin)	22527	$395



Adobe™ PostScript for Under $1600

The new 17-font **TI microLaser** offers all of the features of the 35-font version — less 18 resident fonts. *MacUser* awarded the **TI microLaser** 4.5 mice and said it "outperforms its competitors."

Texas Instruments
17-Font microLaser 22856 $1595

See listings for more microLaser options



NEW LOW PRICE! $52/Megabyte

Get the most processing power out of your Mac: build your four-slot SE to 4MB or your 8-slot Mac to 8MB. Only the best surface-mounted 80 nanosecond memory products. Call MacsFax for pricing chart.

2 x 1MB SIMM Kit —80ns (Technology Works). 25480 $104
4 x 1MB SIMM Kit —80ns (Technology Works). 25482 $208

MONITORS AND VIDEO CARDS

MacAvenue		
Protegé Dual Page Display w/ Mac II Card	22017	$895
Protegé Dual Page Display w/ SE Card	22015	$895
Protegé Dual Page Display w/ SE/30 Card	22016	$895
Protegé Full Page Display w/ Mac II Card	22013	$495
Protegé Full Page Display w/ SE Card	22011	$495
Protegé Full Page Display w/ SE/30 Card	22012	$495
Micron		
Mac II 8-Bit 1024X768	23544	$585
Mac II 8-Bit 640X480	23543	$345
SE/30 8-Bit 1024X768	23542	$585
SE/30 8-Bit 640X480	23541	$345
RasterOps		
19" monitor w/ Color Board 708	22006	$4550
Color Board 208	23538	$375
Color Board 264	23531	$575



Wired for Performance

To build a high-performance network, you need the best cables. **MacAvenue** offers two of the most popular (and reliable) phone connectors to get your system wired. Take a look at the product listings for more **MacAvenue** cable options.

MacAvenue Connectors
Phone Connector DB-9. 22522 $23
Phone Connector Din-8. 22523 $25

Colorboard 264/SE30	23539	$685
ColorBoard 364	23540	$974
Grey Scale 19" monitor GS for Mac II	22007	$1614
Seiko		
14" Color RGB	22002	$595
20" Color w/ 8-Bit 1024X768 Mac II	22018	$2770
20" Color w/ 8-Bit 1024X768 SE/30	22019	$2770
20" Trinitron Color Monitor w/o card	22009	$2395
Seiko/RasterOps		
14" w/ ColorBoard 208	22005	$909
14" w/ ColorBoard 264	22001	$1119
Sigma Designs		
Colormax 19" monitor w/ Mac II adapter	22000	$4645
L-View Multi-Mode 19" w/ Mac II adapter	22008	$1495
PageView 15" w/ Mac II adapter	22100	$1050
PageView 15" w/ SE adapter	22101	$999
PageView 15" w/ SE/30 adapter	22106	$1050
SilverView 21" w/ Mac II adapter	22104	$1599
SilverView 21" w/ SE acapter	22107	$1599
SilverView 21" w/ SE/30 adapter	22103	$1599
Sunkyong		
Full Page Monitor	22010	$349

ACCELERATOR AND EXPANSION BOARDS

DayStar		
030 25MHz IIcx w/ co 68882	23640	$1499
030 33MHz IIcx w/ co 68882	23641	$1899
030 40MHz IIcx w/ co 68882	23642	$1999
030 50MHz IIcx w/ co 68882	23643	$2599
50MHz PowerCache IIci	23649	$1995
Technology Works		
IIci Cache Card	23648	$269

MEMORY EXPANSION

Applied Engineering		
1MB Upgrade for MacRam Portable Card	25488	$359
MacRam Portable Card w/ 1MB	25487	$499
Bay Electronics		
1MB TI Laser Memory Upgrade	25489	$159
Interex		
Tool kit; 3 pieces	26881	$13.49
Technology Works		
2 X 1MB SIMM Kit 80ns	25480	$104
4 X 1MB SIMM Kit 80ns	25482	$208
4 X 4MB II/IIx SIMM Kit	25490	$1195
4 X 4MB IIfx SIMM Kit	25491	$1399
4 X 4MB SIMM Kit 80ns	25481	$1120
Mac Portable 1MB Upgrade Kit	25485	$389
Mac Portable 3MB Upgrade Kit	25486	$1195

MacAvenue

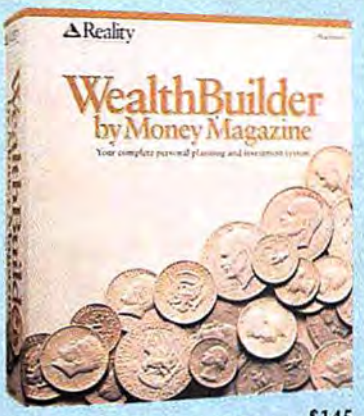
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WealthBuilder by *Money* magazine will guide you through the stormy waters of financial planning and give you advice on investing, saving and strategic planning. You just ask questions, **WealthBuilder** has all the answers.



WealthBuilder v1.0 by *Money* magazine (Reality Software). 28496.....$145



HP Printing Utility

MacPrint lets you print from any Mac application to the Hewlett-Packard LaserJet and DeskJet series printers as well as the Epson EPL 6000. Convenient Chooser-level driver selection provides straight forward Mac printing.

MacPrint v1.2 (Insight). 30428.....$94

Safety, Maintenance and Repair Utilities

DATA ORGANIZATION

On Technologies		
OnLocation v1.0	30434	$75

DATA STORAGE, MANAGEMENT/REPAIR

Baseline		
APB Express v1.0	30544	$55
Central Point		
Mac Tools Deluxe v1.01	30365	$79
Microcom		
911 Utilities	30550	$92
Complete Undelete v1.0	30420	$48
Salient		
Disk Doubler v3.0	30546	$47
Symantec		
Norton Utilities for the Mac v1.0	30436	$79
Sum II v2.0	30340	$98

SHORTCUT AND TIME SAVING UTILITIES

Individual SW		
101 Scripts & Buttons	30426	$35
Software Innovations		
HandOff II	30510	$51

SCREEN SAVER UTILITIES

Berkley Systems		
After Dark v2.0	30425	$24
Fifth Generation		
Pyro v4.0	30399	$25
Ibis Software		
Protector Shark	30538	$31

VIRUS DETECTORS AND ERADICATORS

Microcom		
Virex v2.7	30413	$53
Symantec		
SAM v2.0	30342	$63

OTHER UTILITIES

Abbott Systems		
CanOpener v1.1	30348	$63
Baseline		
Talking Moose v3.0	28762	$23
Broderbund		
SimEarth	28764	$45
CE Software		
QuicKeys v2.0	30357	$94
Custom Applications		
Freedom of Press Light v3.0	30554	$58
Freedom of Press v3.0	30444	$255
Fifth Generation		
Suitcase II v1.2.3	30402	$47
GDT		
ParaLink Express	30548	$99
Insight Development		
MacPrint v1.2	30428	$94
Now Software		
Now Utilities v2.0	30498	$75
Power Up		
Calendar Creator v1.0	30432	$41
Letter Writer Plus/Address Book Plus v1.0	29404	$85

CD-ROM Software

ON THE LEARNING CURVE

Wayzata		
US Civics	28012	$79
World Factbook 1989	28014	$79

GRAPHIC ART COLLECTIONS

NEC		
Clip Art 3D	29880	$241
Image Folio	29882	$244
Photo Gallery	29884	$244
Type Gallery	29886	$244
Wayzata		
US Seals	29304	$55
Recognize!	30640	$479



12 Utilities in a Single Box

Cut corners and streamline your Mac operations with Now Utilities from Now Software. For starters, you can customize your Finder, rename your Inits or add a pop-up menu of most-used folders. Use a few of these handy utilities and you'll wonder how you got by without them.

Now Utilities (Now Software). 30498.....$75

Mac Avenue

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That's as easy as 1, 2, 3!

1 **30-Day Money-Back Guarantee**
Every hardware product and every office accessory MacAvenue sells will give complete satisfaction. If not, return it in the original packaging within 30 days of purchase for a full refund. Consumable items, opened software, videotapes and shipping costs are not refundable.

2 **Toll-Free Technical Support • 90-Day Product Replacement**
If you experience a problem with anything you purchase from MacAvenue, call our product support staff at *1-800-766-6221* weekdays from 8:00 am to 7:00 pm, CST. We will replace the item and pay Federal Express shipping both ways.

3 **One-Year Limited Warranty**
For up to one full year after your purchase, MacAvenue will replace or repair (at our option and without cost to you) any product with which you are not completely satisfied, and we will pay for Federal Express return freight to you.

Everything at MacAvenue is designed to give you the affordable, reliable Macintosh products you want *when you want them.*

Orders placed by 8:00 pm, CST, weekdays for in-stock items ship the same day (barring system failure) with a $2 overnight delivery charge.

For your convenience, we accept VISA, MasterCard, Discover or American Express — no surcharge will be added.

If you use a credit card to pay for your order, your account will not be charged until we ship your order.

If we have to split an order into two shipments, you will be charged only once for shipping. All orders under $30 will be shipped UPS Ground.

COD orders accepted (Add $8, including shipping)

Corporate and institutional purchase orders accepted, $500 minimum for the first order, $50 thereafter.

Look for MacAvenue products in the following CompuAdd Superstores:

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Austin, Texas — Shoal Creek
Chicago, Illinois — Golf Road
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800-395-6221

Key Code 870

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Who Does More Translations Every Day?

MacUser EDITORS' CHOICE AWARD WINNER

With hundreds of thousands of users and over 175 translator options, MacLinkPlus/PC is the world's leading file translator.

Only MaclinkPlus/PC gives you one-step translation and transfer in either direction between Macintosh and PC, Sun or NeXT. Files created in one program on one machine arrive ready to use in a different program on a different machine.

For example, you can take a document created in WordPerfect on the PC and send it to Microsoft Word on the Mac, so it arrives completely ready to use, with style and formatting intact... graphics too! The product comes complete with everything you'll need... software for both machines, built-in communications to work with the included cable or your modems, and our complete library of over 175 translators.

MacLinkPlus/PC eliminates the time loss, the productivity loss, and the dollar loss caused by frustrating hardware and software differences. It lets you continue to use your machine and programs of choice without giving a thought to incompatibility with clients, other departments, and other users.

So put an end to costly hardware and software disputes with the industry's most diplomatic solution — MacLinkPlus/PC.

If you're already using your server, network, or DOS drive to access PC files, then you can simply purchase MacLinkPlus/Translators. It's the same product without the cable and communications software.

For more information, call DataViz at (203) 268-0030.

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SURVIVING THE CRASH: Hard-Disk Recovery

You can pay now or later, but someday you're certain to need one of these four indispensable lifesavers.

BY JACKIE TAYLOR, PAUL WOLF, AND THE MACUSER LABS STAFF

It's 2:00 in the morning. You're finishing a crucial presentation that will make or break your career. Suddenly your mouse stops dead in its tracks, and your heart skips a beat. You restart the computer — but instead of the reassuring happy-Mac icon, you're faced with a blinking black question mark. Your hard disk is damaged. You're in big trouble.

This can happen to anyone, at any time. Software can be unreliable, and viruses can wreak havoc on precious data. You can accidentally delete an important file or even erase your entire disk. Sooner or later, you *will* encounter a data-destroying hard-drive problem — and you can bet that it will happen when you're on a tight deadline.

Regular, frequent backups will, of course, save you in the event of any crash. But let's be honest: Not even the most conscientious of us perform backups as often as we should, and the hours' worth of work since your last backup is still worth recovering — and is often the most valuable.

PHOTOGRAPHY: WALT DENSON MODEL: EDWARD QUINN, LOOK MODELS



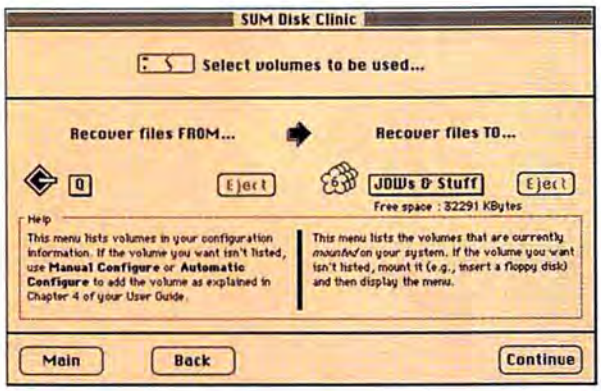


Figure 1: SUM II was able to recover our files in most situations, but if the crashed disk did not appear in SUM's "Recover files FROM . . ." list, we were forced to navigate through a series of sometimes-confusing dialog boxes — more choices than a panicked user should have to deal with.

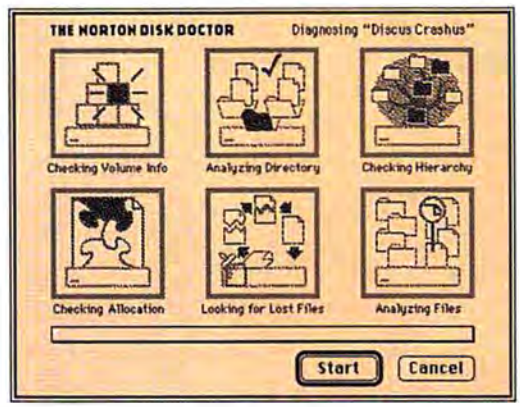


Figure 2: Norton Disk Doctor — Norton Utilities' main recovery program — gives you a visual guide that tells you which critical data structures it's checking. It then gives you the option of fixing each problem. In our tests, Norton Disk Doctor successfully recovered the disk in place more often than any other program did.

To save you days — perhaps even months — of work as well as countless hours of anguish, you should have a hard-disk-recovery program installed on your drive. Such a program can often return your crashed disk to its original working state, something a tape backup can't do.

But which one? To find out, MacUser Labs tested four recovery packages: Central Point Software's MacTools Deluxe, Microcom's 911 Utilities, Symantec's Norton Utilities for the Macintosh, and Symantec's SUM II. We also looked at Apple's Disk First Aid — which comes with Apple System software — because it can diagnose and fix some minor problems. Besides emergency recovery, the four recovery programs also offer backup programs, virus detection, and other useful software. But the main reason to buy any of these packages is for recovering valuable data.

To put the programs through the *MacUser* wringer, we wrote our own program for crashing disks: DiskCrasher. More dangerous than the worst virus, DiskCrasher can render all the data on a hard disk unusable. This is one program that *won't* become part of the download library of Zmac, *MacUser*'s on-line service.

We discovered that many factors make one recovery program better than another. Can it recover all the files? How long does it take? Do files remain in the right folders, or are you forced to reorganize your thousands of files? Is the program easy to use, or would a panicked user be completely overwhelmed? Is the manual helpful if you're in a hurry? A recovery program should make your life as easy as possible.

An Ounce of Prevention

The recovery packages come in two parts. The first is the recovery program you run when your hard disk has crashed. The other is an INIT that stores copies of the critical information the Mac uses to keep track of files and folders. This INIT should be preinstalled — so if you buy a recovery program after your disk has already crashed, the INIT won't do you much good.

Many people don't think about recovery software until they're in big trouble. But you should still install the recovery INIT from your recovery program on your hard disk *even if everything seems to be in working order*. Your chances of fast and complete recovery will be significantly better if the INIT is installed on your disk prior to a disaster. If you have a software catastrophe before you get a chance to install it, however, there is still hope, if you use the right recovery program.

The information your Mac uses to find data on a hard disk is stored in what are generically called *data structures*, with names such as VIB (volume-information block), AVIB (alternate volume-information block), catalog B-tree, extents B-tree, volume bit map, and Desktop file (see the "How It Works: Hard-Disk Data Structures" sidebar). If these sound a little scary, don't worry — you'll never have to deal with them directly. Your Mac uses these data structures as you would a card catalog in a library. If you can't find a book's card, you assume the book is not in the library. If any data structure is corrupted, the Mac may assume that a file does not exist. Worse yet, the Mac may not be able to recognize the disk at all.

A recovery utility can resurrect files that have been accidentally deleted or damaged by software corruption. Even if you erase your entire hard disk, a recovery program may be able to save you. However, if your hard drive falls off the table and stops working or it won't boot because your SCSI bus is improperly terminated, a recovery program isn't going to help (see the

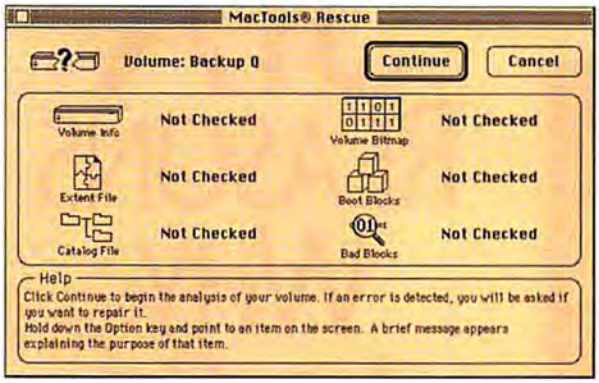


Figure 3: MacTools Rescue, like Norton Disk Doctor, checks the critical data structures on a hard disk, displays messages about what is wrong, and allows you to choose whether to fix each problem. MacTools worked well when it was installed and configured before the disk crashed. Even without being preinstalled, MacTools excelled at recovering deleted files.

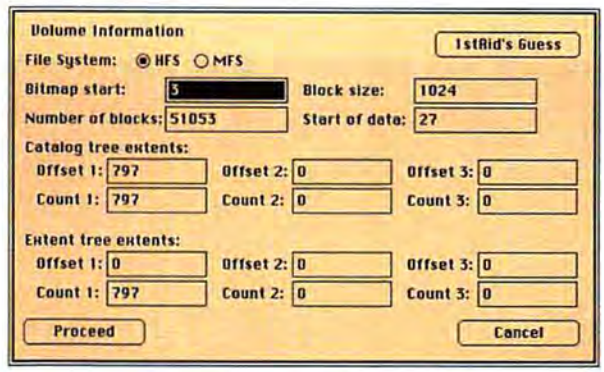


Figure 4: If not installed and configured prior to corruption of a critical data structure, 911 may require that you enter values for the Volume Information parameters. If any of them are wrong, it is unlikely that you will retrieve data. Unfortunately, it is beyond the ability of most users — and some hard-drive vendors — to determine the correct values for these fields.

"Fix It Yourself" sidebar).

Symptoms of software corruption include disappearing or unopenable files or folders (see "Symptoms of a Damaged Hard Disk" in the "How It Works" sidebar). More obvious symptoms include the dreaded blinking question mark and dialog boxes that tell you your disk is unreadable or that it's not a Macintosh disk. These dialog boxes give you the option of initializing your disk. If you want to recover the data, *do not* initialize at this point. Initializing wipes out useful information and makes it even harder for a recovery program to get your files back. Initialization writes zeros over all the data structures that keep track of the files, although the files remain intact on the disk.

Worse than initializing is formatting your disk, which "zeros out" the entire data area, thereby overwriting all files. Recovery software cannot recover files after they have been completely zeroed out by a format, but even after formatting, there is still a chance — however slim — that not all of the disk has been zeroed out.

The Finder's Erase Disk command formats floppies but initializes hard disks. If you accidentally select your hard disk and choose Erase Disk, you may not have to worry too much. Recovery programs can often read files from a hard disk that has been accidentally initialized, especially if the recovery INIT was installed beforehand. The recovery software keeps its own copy of important data structures in a secure place: Some programs create special areas on a hard disk where they store the copies; others let you save the copies onto other hard disks or floppies.

Sometimes files are in fact unrecoverable. When you create a file and save it onto your hard disk, the file is written to the data area of the disk and information about its location and size and other factors is recorded into the disk's data structures. The file's location in the data area is marked as occupied. If you delete the file by dragging it into the Trash, the data structures indicate that the file's location is unoccupied and available for storage, even though the file actually remains on the disk. The next time you save a file, it might be saved onto this "unoccupied" area, thereby overwriting the contents of the first file. If so, the portion of the first file that was written over, perhaps even all of it, will be unrecoverable. A recovery program may be able to recover some data from a partially overwritten file, but there is no guarantee that what's left of the file will be usable.

Setting Up

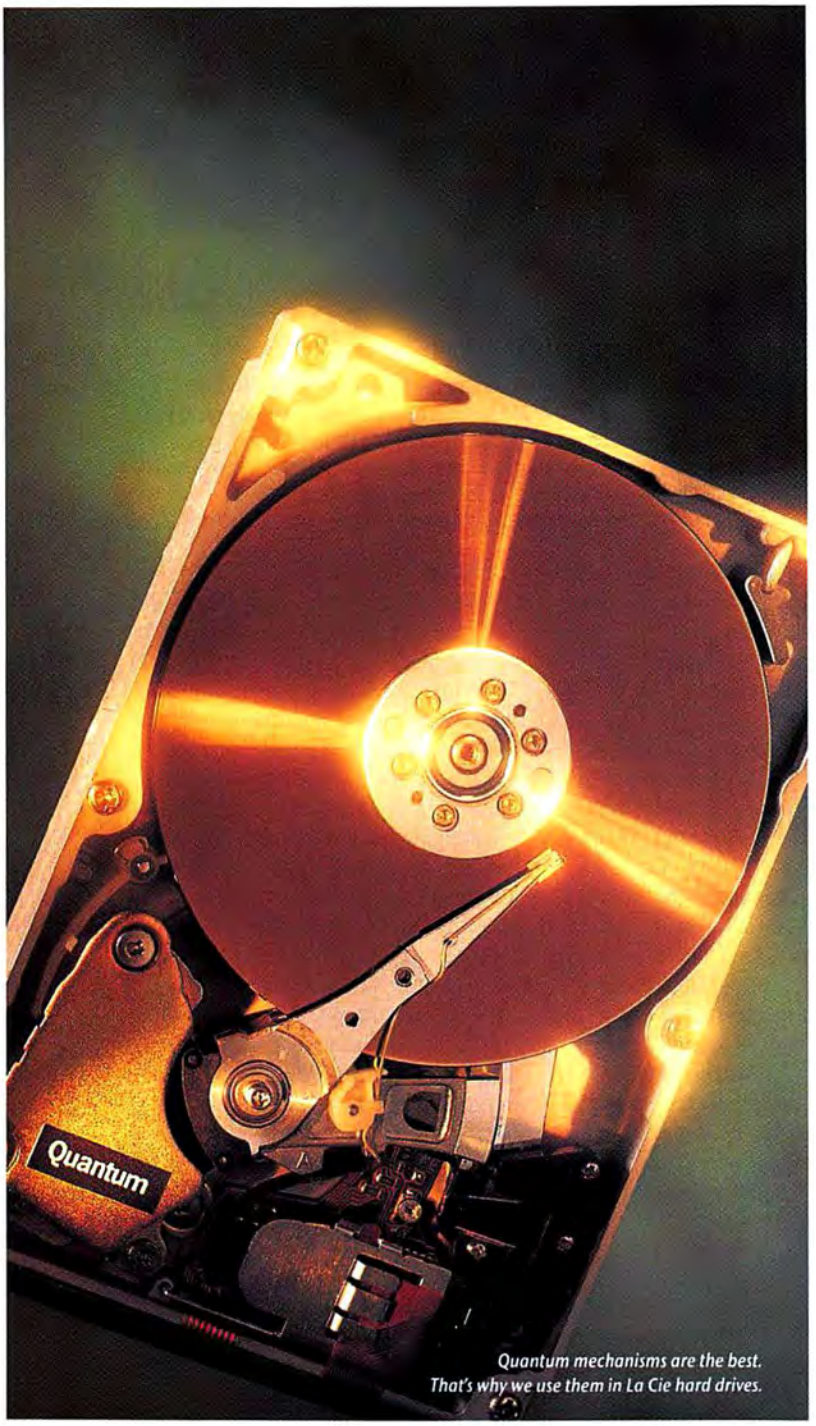
When your drive crashes at 2:00 A.M., the last thing you should have to do is fight with your recovery program. With this in mind, we first compared the programs and documentation for their "panic performance."

Luckily for you, all the packages come with a bootable recovery disk — essential if your one-and-only hard disk has crashed. Don't forget to make a copy of this all-important disk — imagine the depth of your despair if after your hard drive has crashed, your Mac then fails to recognize your one-and-only emergency disk.

The next requirement is documentation that informs while calming your nerves. Norton Utilities' manual is especially helpful if you're in a hurry. Although the SUM II program is difficult to use, its manual is exceptionally "panic friendly," beginning with a flowchart that tells you exactly what to do if your hard disk has crashed. Both Norton Utilities and SUM II have color-coded, easy-to-find recovery-procedure summaries. Norton Utilities also includes the *Norton Disk Companion* booklet, a tour through the inner workings of Mac disk drives and a nice addition to any technical library.

The other manuals are good for

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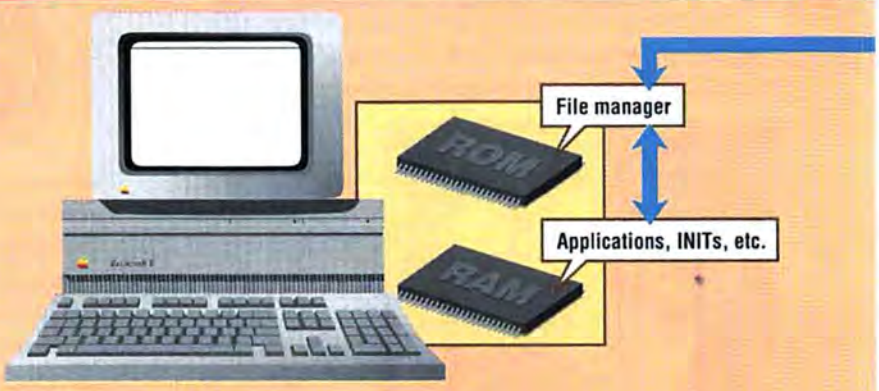
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How It Works: Hard-Disk Data Structures

Programs create, modify, and delete files by using a part of the Mac ROM code called the File Manager. It is the File Manager, in conjunction with the hard disk's driver software, that translates the program's requests and communicates with the disk. The File Manager maintains several data structures on the disk that keep track of files, folders, and their locations.

If any structure becomes corrupted, the File Manager will have problems finding files or recognizing the disk. If, for example, a reset, power-down, or system error occurs while the File Manager is trying to update a data structure on the disk, the data structure can become corrupted. Also, if the File Manager is working with a data structure in the System RAM cache and a software bug corrupts the cache, bad data can be written back to the disk. Symptoms of corrupted data structures can range from a single vanished file to an entirely unreadable disk.



AVIB (alternate volume-information block): a backup copy of the VIB.

Boot blocks: information used to configure the Mac operating system during the *booting* (startup) process. If the boot blocks are corrupted, the volume may mount — appear on the desktop — but it may not work as a startup device.

Catalog B-tree (often called the Directory): indexes the location of every file and the contents of every folder on the disk.

Desktop file: a file the Finder uses to store icons (and the type and creator codes associated with them); also a cross-reference that links applications to the files they can open. Stores the Finder's Get Info comments too.

Driver software: enables the Mac to communicate with a particular hard-disk-drive model. If a drive's SCSI driver has been corrupted, it is unlikely that the Mac will be able to read any data from the drive. It may not even mount.

Extents B-tree: As a file grows, its fragments may be stored on noncontiguous areas of the disk. Each piece is called an extent. The catalog B-tree can index three extents. If a file has more than three, they are indexed in the extents B-tree.

VIB (volume-information block): also known as the master-directory block, it contains the volume name, the number of *allocation blocks* (areas into which files are written) on the volume, the allocation-block size, and other volume attributes. If the VIB is damaged, the drive may be unmountable.

Volume bit map: keeps track of which allocation blocks are occupied by files. Each bit corresponds to a single allocation block (if a block is unoccupied, the bit is set to 0; if it is occupied, the bit is set to 1).

Symptoms of a Damaged Hard Disk

There are many ways to crash a hard disk: system errors, power outages, viruses, and power fluctuations, to name a few. The result can be the corruption of vital data structures the Mac uses to keep track of its contents. Depending on which structure and how badly the structure is damaged, the effect can be subtle or can render your entire drive unusable.



Happy Mac

- **Symptom:** Happy Mac appears briefly and disappears, and then a floppy-disk icon appears with a blinking question mark.
- **Cause:** Bad boot blocks, corrupted disk-data structure, or corrupted system files.
- **Action:** Run recovery program; reinstall Apple System software.
- **Symptom:** Happy Mac flashes on and off; drive does not boot.
- **Cause:** Bad boot blocks or corrupted system files.
- **Action:** Run recovery program; reinstall Apple System software.
- **Symptom:** Happy Mac appears, but the drive seeks repeatedly before booting.
- **Cause:** "Dirty" shutdown from a bomb or a power outage — all file structures were not properly updated before the crash. On the next power-up following a dirty shutdown, the Mac sees that the structures may have been left in an "unclean" state and verifies them. This is the reason for the long delay while the happy Mac is displayed. This usually causes no further problems.
- **Action:** None needed; perhaps run Apple's Disk First Aid to verify that disk is in good shape.



Sad Mac

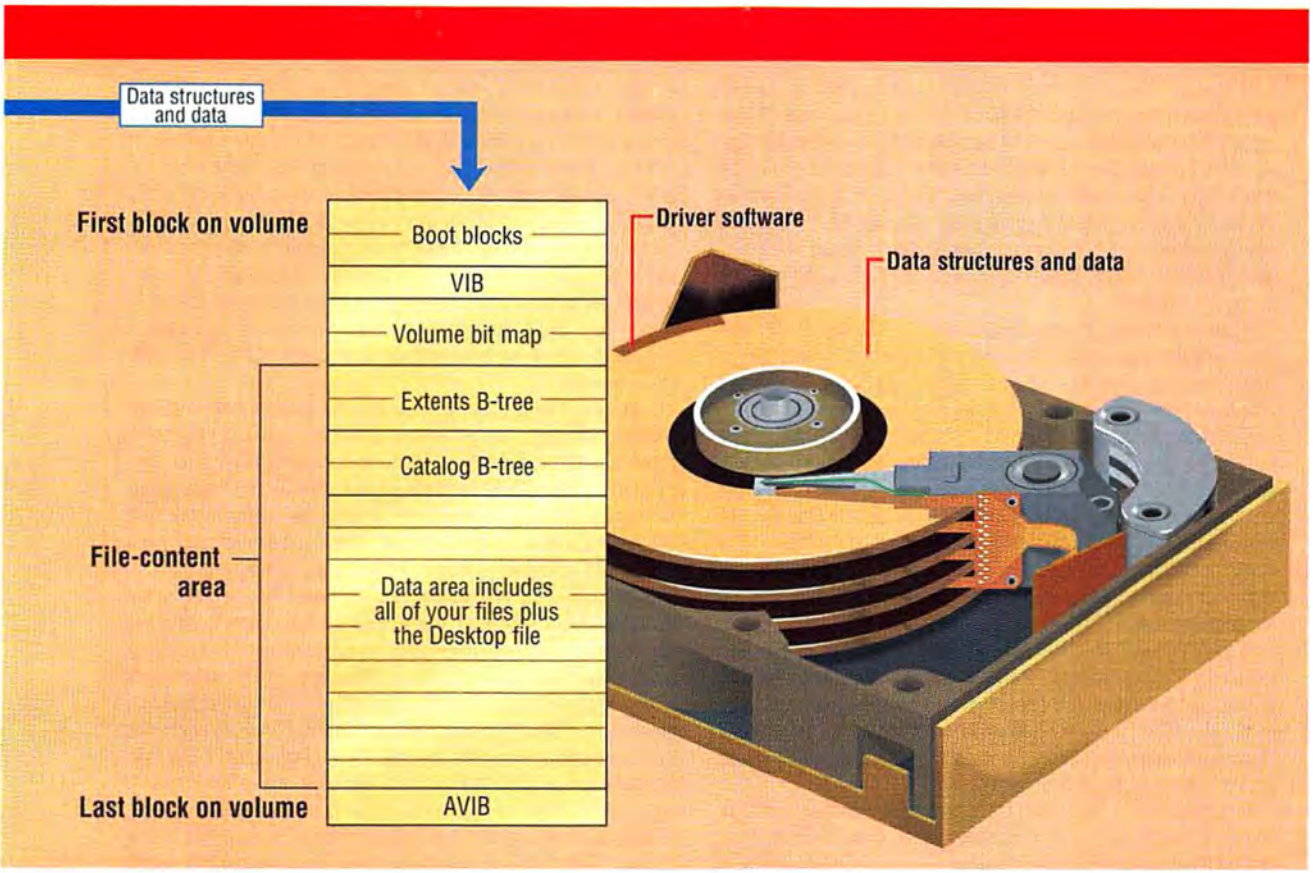
The sad Mac appears when your Mac fails one of the diagnostic tests on startup; it can also indicate that the driver software or boot blocks on the startup disk are bad.

The characters below the unhappy Mac tell you what has gone wrong. With the Mac Plus and earlier, if the first two characters are *0F*, there is some kind of software error; any two other characters mean a hardware failure. With the Mac SE, II, and later, if the last four characters in the first line are *000F*, the problem is software, and the last four characters of the second line indicate the specific error — they correspond to System error codes, which you can look up in *Inside Macintosh, Volume II*, or in a freeware DA called SysErrorTable.



Drive Problems

- **Symptom:** Multiple drive icons appear on the desktop for the same drive.
- **Cause:** SCSI-ID conflict.
- **Action:** Check that all devices have unique SCSI-ID numbers that range between 0 and 6, inclusive.
- **Symptom:** Drive does not mount.
- **Cause:** Can be just about anything — setup, hardware, or software.
- **Action:** Check cables, power, SCSI ID, termination; try updating hard drive's SCSI driver with drive-formatting software.
- **Symptom:** "Disk is full" message when you know the disk is not full.
- **Cause:** Corrupted disk-data structures; invisible or temporary files.
- **Action:** Run recovery program.
- **Symptom:** Drive mounts, but you cannot use it as the startup disk.
- **Cause:** Bad boot blocks, bad System file, or drive-hardware problem.



• **Action:** Reinstall Apple System software; check hardware connections; run recovery program.

• **Symptom:** A dialog box says, "This disk is unreadable. Do you want to initialize it?"

• **Cause:** Corrupted data structure.

• **Action:** *Do not click on OK!* Run recovery program.

• **Symptom:** A dialog box says, "This is not a Macintosh disk. Do you want to initialize it?"

• **Cause:** Corrupted data structure.

• **Action:** *Do not click on OK!* Run recovery program.

• **Symptom:** A dialog box says, "This disk needs minor repairs. Do you want to repair it?"

• **Cause:** Corrupted Desktop file.

• **Action:** Click on OK to rebuild Desktop file.

File Problems

• **Symptom:** Errors reading or writing files in the Finder or in a backup program. Finder message: "Some files couldn't be read (written) and were skipped."

• **Cause:** Disk-media errors; cabling/termination problems.

• **Action:** Check cabling and termination; run hard-drive formatting software and test for bad media.

• **Symptom:** File cannot be opened from within an application.

• **Cause:** File corrupted; file-type code incorrect; wrong version of application.

• **Action:** Check the Get Info box on file; reinstall application.

• **Symptom:** Parent application cannot be opened when you double-click on file icon.

• **Cause:** Application corrupted or missing; file's creator or type codes inconsistent with application; Desktop file corrupted.

• **Action:** Rebuild Desktop file; reinstall the application.

• **Symptom:** You can't throw away a file or folder or empty the trash.

• **Cause:** File or folder busy or locked; invisible file in folder; corrupted catalog.

• **Action:** Restart and try again; rebuild Desktop file; run recovery program.

• **Symptom:** You cannot rename a folder.

• **Cause:** Locked disk; corrupted catalog B-tree.

• **Action:** Unlock the disk; run recovery program.

• **Symptom:** A folder takes a long time to open.

• **Cause:** Excessive number of files in folder; corrupted Desktop file.

• **Action:** Rebuild Desktop file; reorganize folder hierarchy.

• **Symptom:** Programs bomb when you try to launch them.

• **Cause:** Corrupted application or INIT conflict.

• **Action:** Reinstall application; turn off INITs.

• **Symptom:** Icons appear, disappear, or become "generic" icons.

• **Cause:** Corrupted Desktop file.

• **Action:** Rebuild Desktop file.

• **Symptom:** A folder or file disappears.

• **Cause:** Corrupted disk-data structures.

• **Action:** Run recovery program.

System Bomb

• **Symptom:** System error (bomb icon).

• **Cause:** Can be caused by almost any type of software bug — including conflicts with other applications or with an INIT.

• **Action:** Attempt to restart; if bomb persists, run recovery program, reinstall software — and hope for the best.

Fix It Yourself

If you don't own a recovery program, you may still be able to diagnose and fix a hard-disk problem. One frequent source of Mac problems is the Desktop file — an invisible file that provides a cross-reference between files' creator codes and the applications to which they belong. The Desktop file also keeps a record of all the icons on the hard disk and the Get Info information for each file. You can tell when your Desktop file is having problems when icons appear in their generic (rather than application-specific) form or when a folder takes a long time to open.

Rebuilding the Desktop file should fix these problems — and some other inexplicable oddities. Hold down the Option and Command keys while restarting your Mac. You'll be asked if you want the desktop rebuilt. Answer "OK." If you have more than one volume to rebuild, keep the keys pressed until the next dialog box appears. One word of caution, however: By rebuilding your Desktop file, you will lose any comments in any Get Info box.

You can rebuild the Desktop file on floppy disks by holding the Option and Command keys down as you're inserting the floppy. This works only if you're in the Finder, so if you're in an application, quit first — or if you're running MultiFinder, switch to the Finder — before inserting the disk.

If you're having trouble booting and have a Mac SE or later, zap (clear) the PRAM (Parameter RAM) by holding down the Command, Option, and Shift keys and choosing Control Panel from the Apple menu. The PRAM is battery-powered RAM that stores Control Panel settings, including the startup device. If this information gets mixed up, the drive may not boot properly.

If zapping the PRAM doesn't work, try booting from another disk and see if the offending drive's icon will appear on the desktop. If you can get the drive to mount, *back it up* before you do anything else. If the drive mounts but you can't use it as the startup device, there's probably something wrong with the boot blocks or the System software. Use Apple's Installer program to reinstall the System software, and try booting from the drive again. If that doesn't work, start up from your other disk again, back up the drive, initialize it (either by selecting the drive and choosing Erase Disk from the Finder's Special menu or by using the formatting/initializing utility that came with your drive), and then restore your files back to the disk.

If the drive doesn't mount at all, run the formatting/installing utility that came with it and reinstall or update the drive's SCSI-driver software — without initializing or formatting the drive. The SCSI driver is the invisible software the Mac uses to communicate with the drive. If it's been corrupted, a recovery utility will probably not be able to help you out.

If you cannot select the drive in question from within the formatting/installing software, chances are that you have a cabling or hardware problem. Setup problems can include bad or loose cabling, improper termination, and SCSI-ID conflicts. If you have recently changed your SCSI setup, check the connections, change the cables, make sure only the first and last devices are terminated, and confirm that every device has a unique ID number between 0 and 6, inclusive.

Drive-hardware problems are rare, but when they happen, it's a grave situation. A bad power supply or connector must be fixed by the manufacturer; fuses are only sometimes user-replaceable. Problems with the drive mechanism itself are yet more serious; malfunctions can occur in the HDA (head-disk assembly — the part of the drive that contains the disk platters and read/write heads) or in the controller electronics (the circuitry that controls the movement of the HDA and communicates with the computer). If the trouble is within the HDA, there is little hope of recovering data; if it's somewhere in the electronics, there is a good chance the drive can be repaired with the data still intact. In either case, just hope that your warranty is still good. If not, be prepared to spend some money. It might be cheaper to buy a new hard drive, but that won't get your data back.

leisurely reading but not when you're in a panic. The Central Point Software's MacTools manual is thorough but lacks a procedure section for quick recovery. Microcom's 911 Utilities troubleshooting guide is an exhaustive reference for just about all software problems, but the program's instructions are scattered throughout.

If you've bought a recovery program for prevention and not to cure an already crashed disk, you'll need to preinstall it. The only program that doesn't come with an installer program is 911. You have to copy the two 911 files onto your hard disk manually — not a demanding chore. Installer programs don't necessarily make installation fast or easy: SUM II's took almost 15 minutes, and it spent most of that time copying volume-information files for every type of hard disk SUM II knows. Even after all that, it's difficult to tell if SUM II is installed properly for multiple volumes — and SUM II's dialog boxes aren't much help (see Figure 1).

If you're patient enough to set it up right, SUM II does a good job of recovering files when it's preinstalled. Installation after a crash is really a chore, though. Apparently SUM II's Disk Clinic — the main recovery program —scans for SCSI-configuration information only the first time it's run. If you add a drive or change a SCSI-ID number after you've run Disk Clinic, you're forced to go through a bizarre "manual configure" sequence to get the program to see the drive. This is not what you want to be doing when your disk is down.

When you install Norton Utilities onto your hard disk, the installer warns you not to install onto a disk containing files you want to unerase, lest the utility overwrite the files you want to recover. We would have liked the other programs' installers to emphasize this point, given that all the programs can overwrite exactly those files you're trying to recover.

After installation, the next step is to configure the INIT. In all the recovery packages, the INIT doubles as a cdev and is configured in the Control Panel, where you can turn the INIT on and select how many deleted files to keep track of and which volumes to save essential data structures from.

The Norton Utilities and MacTools INITs are straightforward: Check boxes and buttons configure the options

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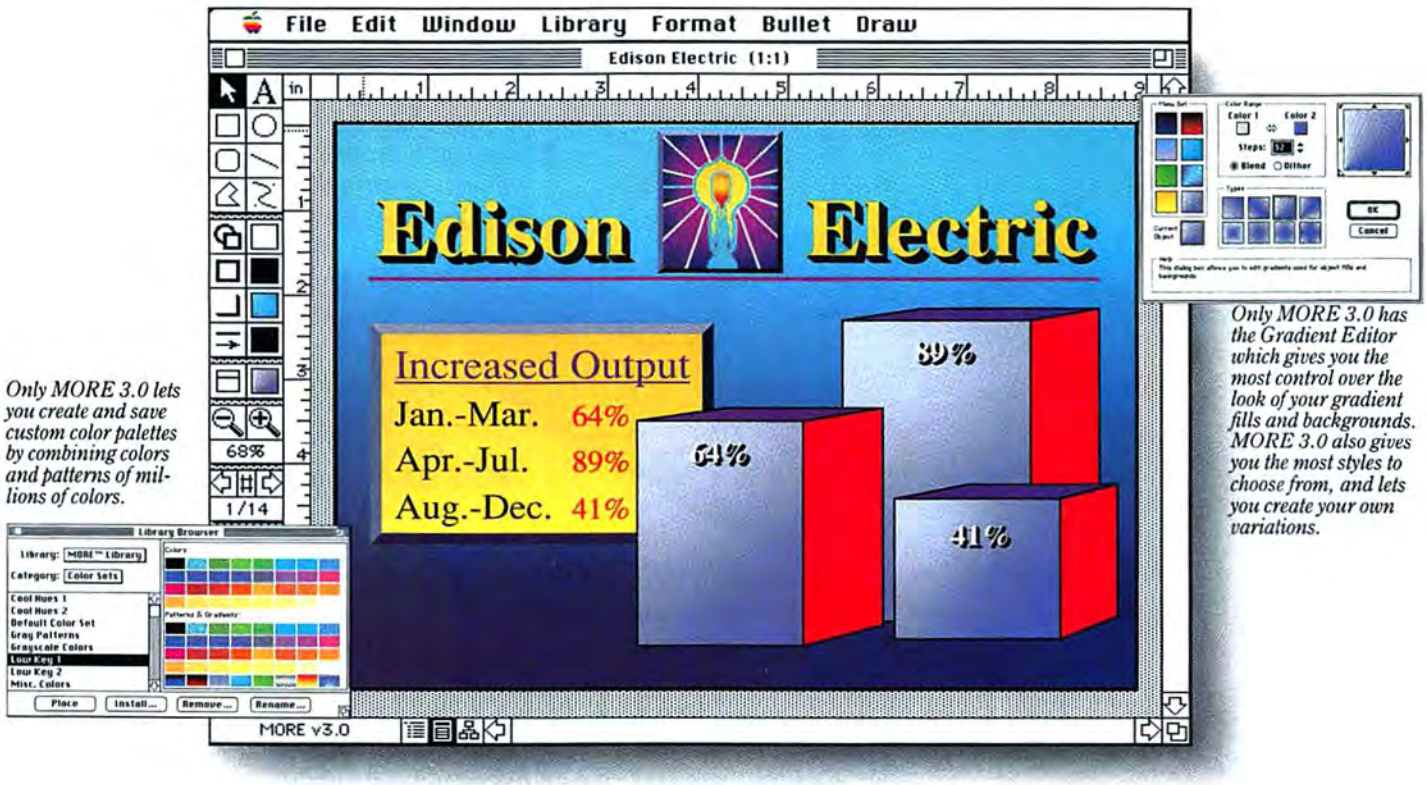
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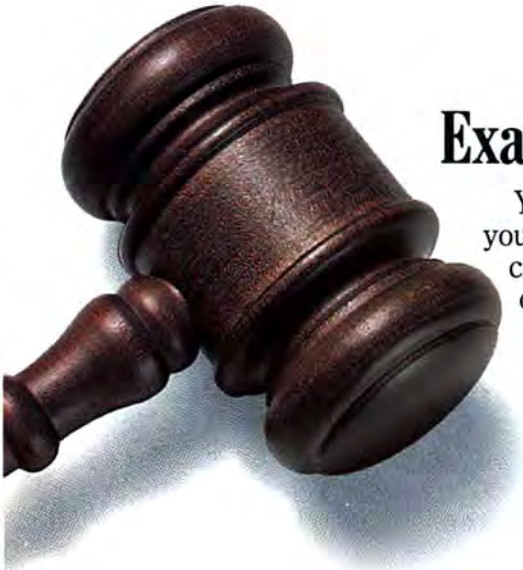
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Figure 5: Crash-Test Results

Key

- ● 100% success rate (disk fixed in place)
- ○ 100% success rate (to second disk)
- ◔ 75% – 90% success rate (to second disk)
- ◑ 50% – 75% success rate (to second disk)
- ◔ 25% – 50% success rate (to second disk)
- — Failure (no data restored)
- NA Not applicable

Corruption Tests

	1. Erase VIB "This is not a Macintosh disk. Do you want to initialize it?"				2. Erase VIB and AVIB "This is not a Macintosh disk. Do you want to initialize it?"				3. Corrupt Catalog Index Node "The disk 'X' needs minor repairs. Do you want to repair it?"				4. Corrupt Catalog Leaf Node "The folder/disk 'X' could not be opened (-127)"			
	Preinstalled		Emergency (no preinstallation)		Preinstalled		Emergency (no preinstallation)		Preinstalled		Emergency (no preinstallation)		Preinstalled		Emergency (no preinstallation)	
File / Folder	File	Folder	File	Folder	File	Folder	File	Folder	File	Folder	File	Folder	File	Folder	File	Folder
Symantec Norton Utilities for the Mac	●	●	●	●	●	●	●	●	●	●	○	◔	●	●	○	◔
Symantec SUM II	●	●	○	○	●	●	○	○	●	●	○	○	●	●	○	◔
Central Point Software MacTools Deluxe	●	●	●	●	●	●	—	—	●	●	—	—	●	●	—	—
Microcom 911 Utilities	○	—	—	—	○	—	—	—	○	—	○	—	○	—	○	—
Apple Disk First Aid	NA	NA	●	●	NA	NA	—	—	NA	NA	—	—	NA	NA	—	—

Figure 5: To test hard-disk-recovery programs, we did the logical thing: We crashed disks. We used MacUser Labs' DiskCrasher, a program that crashes disks in different ways, repeatedly and consistently. We then sent the programs on a data hunt to see how well they could recover the disks' contents.

There were eight crashes in all: for five corruption tests in which we damaged data structures, for one detection test to see how smart the programs were in sensing nonfatal problems, and for two tests that simulate user errors. We ran each of the eight crash tests in two ways: first, in an emergency situation without having preinstalled the programs, and second, after having installed the programs along with their INITs.

Ideally, the recovery program fixed the crashed disk "in place" — returned it to its previous working state with all files intact. If this wasn't possible, we tried to recover the files to another volume, preferably with the folder hierarchy intact.

1. Symptom: "This is not a Macintosh disk. Do you want to initialize it?"

The VIB contains the most-basic data about the volume — the number of blocks on the disk and the locations of the other data structures. When the VIB has been erased, the volume will not mount on the desktop. The recovery programs' task is to either regenerate the VIB or get the data off the damaged disk and restore the contents of the crashed disk to another disk.

Without preinstallation — no INITs installed and no backup-volume information — Norton Utilities, MacTools, and Disk First Aid were all able to fix the problem and restore the original disk. SUM II was able to recover all the files to another disk. 911, however, was unable to guess the proper volume-information parameters and required the user to enter them manually — an unreasonable requirement. 911 was the only program that could neither fix the crashed volume in place nor recover any folder hierarchy.

2. Symptom: "This is not a Macintosh disk. Do you want to initialize it?"

The Mac keeps a second copy of the VIB called the AVIB. This test destroyed both. Without its INIT, MacTools flunked. MacTools, like Apple's Disk First Aid, apparently uses the AVIB to recover the crashed disk. Norton Utilities and SUM II apparently handle this situation by figuring out what should be in the VIB, either making good guesses or examining other parts of the disk for hints.

As in the previous test, preinstalling the programs' INITs enabled all of them to fix the damage to the volume in place — except for 911, which recovered all the data to another disk and lost all the folders in the process.

3. Symptom: "The disk 'X' needs minor repairs. Do you want to repair it?"

The catalog B-tree consists of a collection of *index* and *leaf nodes*. An index node can be thought of as a fork in a branch. At the end are leaf nodes, which contain the records that index files and folders. If an index node

	Detection Test		User-Error Tests													
	5. Corrupt Both Catalogs "This disk needs minor repairs. Do you want to repair it?"		**6. Erase AVIB** No visible symptoms		**7. Delete File** You have inadvertently dragged a file into, and then emptied, the Trash.		**8. Erase Disk** You have inadvertently used the Finder's Erase Disk command.									
	Preinstalled		**Emergency** (no preinstallation)		**Preinstalled**		**Emergency** (no preinstallation)		**Preinstalled**		**Emergency** (no preinstallation)					
	File	Folder	File	Folder	detect	fix	detect	fix	File	Folder	File	Folder				
Symantec Norton Utilities for the Mac	●	●	○	◔	yes	yes	yes	yes	○	○	◔	▱	●	●	▱	—
Symantec SUM II	●	●	○	▱	no	no	no	no	●	—	▱	—	●	●	▱	—
Central Point Software MacTools Deluxe	●	●	—	—	yes	no	yes	no	○	—	◔	—	●	●	◔	—
Microcom 911 Utilities	○	—	○	—	no	no	no	no	●	—	—	—	—	—	—	—
Apple Disk First Aid	NA	NA	—	—	NA	NA	yes	no	NA	NA	—	—	NA	NA	—	—

Key

- ● 100% success rate (disk fixed in place)
- ○ 100% success rate (to second disk)
- ◔ 75% – 90% success rate (to second disk)
- ▱ 50% – 75% success rate (to second disk)
- ▱ 25% – 50% success rate (to second disk)
- — Failure (no data restored)
- NA Not applicable

is corrupted, the Mac may not be able to find any files or folders whose leaf nodes are at the end of that branch.

Without INITs, none of the utilities could fix the catalog in place. SUM II and Norton Utilities were able to recover all the files to another volume. 911 recovered all but one file and no hierarchy to a different volume, whether or not it had been preinstalled. With INITs, Norton Utilities, SUM II, and MacTools restored the volume in place.

4. Symptom: "The folder/disk 'X' could not be opened (-127)"

Each *leaf node* contains records that index folders and/or files. If a leaf is corrupted, any files and folders indexed by that node are likely to be lost.

The results of this test were similar to those of the Catalog Index test, except that SUM II lost track of two files and both SUM II and Norton Utilities failed to recover as many folders as they had in the Catalog Index test.

5. Symptom: "This disk needs minor repairs. Do you want to repair it?"

This test is a true challenge of a recovery program's abilities, because the index and the leaf nodes are corrupted. All the programs did as well on this test as they had done on the Catalog Leaf test, except for SUM II, which lost three files.

6. Symptom: None visible.

Although you wouldn't notice if your AVIB was gone — until you lost your primary VIB — a recovery utility should be able to detect and correct its absence. Only Norton Utilities and MacTools could properly detect the problem, and only Norton Utilities could fix it.

7. Symptom: You have inadvertently dragged a file into, and then emptied, the Trash.

Without their INITs, none of these utilities was 100 percent successful. MacTools recovered significantly more files than did either Norton Utilities or SUM II, and it did so on the first try, whereas getting Norton Utilities to find the files needed two different methods.

With their INITs, all four utilities were completely successful, but only SUM II and 911 retrieved the files onto the original disk. Norton Utilities could indicate the folders the files were originally in — very useful when you have a lot of files.

8. Symptom: You have inadvertently used the Finder's Erase Disk command.

When an Erase Disk command is executed, the Mac zeros out the catalog and other data structures on the disk. The actual disk data is still there. This test determined whether the products could retrieve the files by using only the remnants left by Erase Disk or, in the case of preinstallation, by using the copies of the catalog that the products' INITs had previously created.

MacTools repeated its impressive performance — with Norton Utilities and SUM II drifting further behind. All four retrieved every file but one that had been obliterated by the new Desktop file created after the Finder's Erase Disk had finished.

for any drives on the SCSI bus (see Figures 2 and 3). Again, the SUM II setup is a bit confusing — the program doesn't allow you to configure the features for multiple volumes. Instead, you have to run the installer again to save the data structures for a second hard disk.

The Norton, SUM II, and MacTools INITs keep track of deleted files in addition to copying critical data structures to help restore disks. Microcom's 911 INIT keeps track of deleted files, and the main program allows you to manually back up the data structures, but it's not immediately obvious that the program lets you do this. Searching through the manual was little help. In fact, we had trouble finding clear instructions on how to use most aspects of the program.

Hardest to use overall was 911, running us into a brick wall during several tests. At one point, we had to enter information on our hard-disk data structures manually, because 911 couldn't recover files with the parameters it had "guessed." We had to call the hard-drive manufacturer and ask for the information we needed to fill in a dialog box that requested "Bitmap start," "Block size," "Start of data," and so on (see Figure 4). These are numbers everyday users should *never* have to wrestle with — and the person you talk to at the drive company may not have the correct numbers on hand.

The two programs that never forced us to pore through their manuals were Norton Utilities and MacTools Deluxe. The friendly Norton Disk Doctor interface guides you through diagnostics, informs you of any problems with the critical data structures, and allows you to fix each one individually if you wish. MacTools' Rescue program has a similar easy-to-follow diagnostic procedure.

Crash Tests

We tested how well each recovery program handled three types of disk problems: corruption, detection, and user error. We conducted eight different crash tests that simulated these problems: five corruption tests of damaged data structures, one detection test that determined how smart the programs were in sensing problems, and two tests that simulated user errors.

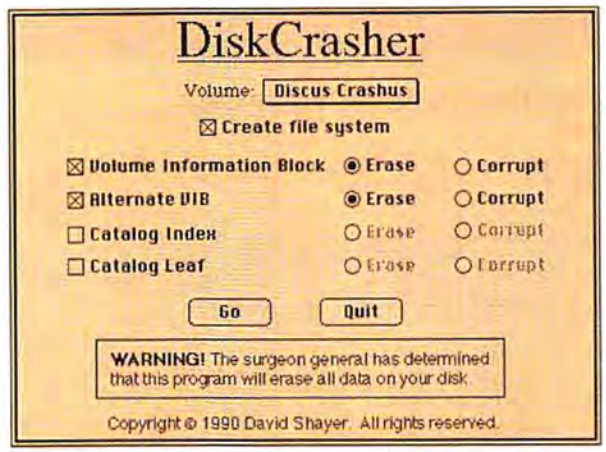


Figure 6: MacUser Labs' DiskCrasher provided a controlled series of crashes for our tests. By erasing or corrupting critical data structures in a set of text files, these tests simulated the kinds of problems that can be caused by bug-ridden software or bad media.

We crashed disks with MacUser Labs' DiskCrasher (see Figure 6), which was written to crash disks in different ways repeatedly and consistently. DiskCrasher first creates a set of text files in a three-level folder hierarchy and then erases or corrupts various data structures, thus "crashing" the disk. Different crashes yield different symptoms.

DiskCrasher's corruption tests are cruel things to do to a hard disk — they involve corruption or erasure of the critical data structures the Mac uses to identify and locate files. The DiskCrasher detection test erases a data structure (the AVIB) whose absence doesn't produce any visible symptoms but that should still be restored for maximum safety. Finally, DiskCrasher simulates those dumb user errors we hate to admit we all make: throwing away an important file or accidentally erasing a hard disk.

After introducing all these problems, we sent each recovery program on a data hunt. We ran the eight crash tests in two ways: first, in an emergency situation without having preinstalled the programs, and second, after installing the programs along with their INITs. After each recovery, we checked to see how many files were recovered and if the files' data was intact. We also took note of whether all files were in their appropriate folders and whether the folder hierarchy — the order of files and folders in other folders — had been altered.

Whether or not your recovery software is preinstalled, you probably don't have much time to spare when you're recovering your crashed disk. The fastest way a recovery program can get you up and running after a crash is to fix the hard disk itself by repairing its corrupted data structures. So we first asked the programs to fix the drive *in place* — that is, to return the drive to its original precrash state. If that failed, we then recovered files to a second hard disk. All the programs also allow you to recover files to multiple floppies, although if you have a large hard disk, be ready to do a lot of disk swapping.

Scanning for files and folders and recovering them to another disk takes much longer than fixing in place. Scanning alone can take several minutes, depending on the size of the drive. The time it takes to copy the files depends on how many megabytes you need to recover and whether you are copying the files to another hard disk or to floppies. However, any scan-and-recover time is well worth it if you manage to get your files back.

The Super Saver

The clear winner was Norton Utilities for the Macintosh. This program recovered the greatest number of files,

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Line Screen: 160 lpi Color Correction: None



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An Ounce of Prevention

Everyone who uses a hard-disk drive — and that's pretty much everybody who uses a Mac — should have a backup program and at least one recovery program. You should back up your files regularly, because not even the best recovery program can remedy a hardware failure.

The most obvious way to back up is to copy files from your hard disk to floppies, but if you're backing up a large drive, swapping floppies is a hassle — and human nature being what it is, the more hassle, the less frequently you'll back up. You can get larger HFS volumes (hierarchical-file-system volumes, whose icons appear on the desktop) such as removable magnetic drives. SyQuest, Bernoulli, and Ricoh cartridges can hold more than 40 megabytes each, and a magneto-optical cartridge can hold from 600 megabytes to a gigabyte (1,000 megabytes) of data. You can also use a tape drive — a DC600, DC2000, TEAC, or DAT — made expressly for backup. Your need for a dedicated device depends on how much data you plan to back up each day.

Whatever hardware and media you decide on, the right software can make a big difference in the ease of backup and thus in how often you will back up. Backup-software features can be basic or complex. Most programs perform *incremental* backups, in which only the files that are new or changed since the last backup are backed up, so incremental backups may take you only a few minutes per day — well worth the trouble when your hard disk starts acting flaky. More-complex backup programs work with most backup devices on the market and allow you to centralize backups of an entire network, run unattended backups, create scripts, and compress or encrypt files.

Two of the recovery packages reviewed in this article include backup programs. The SUM II package includes SUM BackUp, which works with any HFS volume. The MacTools Deluxe package includes a backup utility that works with HFS volumes and Apple tape drives.

There are also two ways to keep a duplicate image of your hard disk on another hard disk. Disk mirroring uses software to write the data written to one hard disk onto a second hard disk on the same SCSI chain. Disk duplexing uses a separate SCSI bus to create a duplicate image. Neither method is a replacement for backup, however. Although disk mirroring and duplexing will help you out in the event of a hardware failure, they are not likely to prevent data loss due to software corruption — the usual cause of a hard-disk crash. Because the drives are duplicates and both are active at the same time, if a virus or a bug-ridden application trashes your first disk, the second drive will probably also fall victim.

Disk-mirroring software also slows down some operations of your system, because the SCSI bus cannot transfer data to two different devices simultaneously. Write operations can take twice as long as they would without the mirroring software. Disk duplexing, on the other hand, uses a separate SCSI bus, so it doesn't slow down the Macintosh.

After you've decided on the best backup hardware and software for your needs, back up often. Keep multiple complete backups, because even backup media can become damaged, lost, or inadvertently overwritten. Rotate among these backups, so all copies are relatively recent. Also, keep an up-to-date backup in a completely different location, such as a safe-deposit box or at home.

maintained the most correct hierarchy, and restored the disk to its original state more often than any other program (see Figure 5). Norton Utilities was also the fastest in scanning the disk and saving information at shutdown.

When we ran these tests without the INITs installed, Norton Utilities still led the pack, completely fixing the disk in place in two corruption tests. In the other three corruption tests, Norton Utilities successfully recovered all the files and most of the hierarchy to a second hard disk. SUM II was second, recovering all files from three of the corruption tests but always to a second hard disk. SUM II even did slightly better than Norton Utilities in one of the corruption tests, completely recovering the folder hierarchy. Without the INIT, MacTools was virtually useless in the corruption tests. MacTools is not the program to buy if your hard disk has already crashed.

All the programs fared better when we had installed and configured them before the test. MacTools, Norton Utilities, and SUM II all performed well in the corruption tests, usually recovering all (or almost all) the files and usually getting the folder hierarchy correct. When preinstalled, 911 recovered nearly all the files but failed to recover any hierarchy. Because the files were displayed in the correct hierarchy in the program's window, we were curious about why it didn't recover the hierarchy. When we asked Microcom, we were told that 911 often loses the hierarchy.

In the user-error tests, all the utilities, with the exception of 911, recovered most or all of the files with the INITs installed. When we used the Erase Disk command on the Finder Special menu to erase the hard disk, 911 failed to recover any files. The 911 program keeps a record of deleted files on the same disk where it is installed, and Erase Disk apparently erases the record's file along with the rest of the files on the disk.

In the user-error tests without the INITs installed, MacTools recovered more files than did any of the other utilities, more than 80 percent for both tests. Norton Utilities was a not-so-close second, with SUM II third and 911 unable to recover any user-deleted files.

In the detection test, Norton Utilities and MacTools were able to detect that the AVIB data structure had been erased, but only Norton Utilities repaired the problem. SUM II and 911 couldn't find anything wrong.

Bonus Software

Besides being the clear winner in the recovery tests, the Norton Utilities package includes some handy utilities that make it an even better buy. Norton's Fast Find is what Apple's Find File should be: It lets you speedily search multiple volumes at once and open files and launch applications from within the DA. The Directory Assistance INIT enhances the standard

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The other three programs also offer some handy additional utilities. One of the better ones is 911's Virex, a virus-detection program. To their credit, SUM II and MacTools are the only ones to include backup programs. But to their discredit, they both offer a feature we don't recommend using: soft partitions.

Soft partitions can be dangerous to your data. The Mac's operating system lets you treat a single hard disk as multiple volumes, or *partitions*. Partitions come in two types: hard and soft. A hard partition is created by separating a physical hard disk into several logical areas, defined at a basic level that is transparent to the Mac. The Mac sees hard partitions as separate hard disks, even though there is only one physical hard disk. In the case of soft partitions, software fools the Mac into thinking there are separate partitions by defining large *files* as separate partitions. Not all hard partitions necessarily crash when a software problem attacks a hard disk, but all soft partitions on the same hard disk will be affected by a software crash. Soft partitions also lack the performance enhancements of hard partitions, and they are incompatible with some backup utilities. We don't recommend using any program's soft-partition feature — if you want to partition your hard disk, use formatting software that offers hard partitions.

Conclusion

Recovery software and backup routines are critical to the safety of your data. One is not a substitute for the other; both hardware failure and software corruption are constant threats to your hard disk. Used in tandem, backup and recovery software provides a safety net for your valuable work.

Recovery programs should help you immediately in panic situations and, when preinstalled, guard against future problems. They may also come with extra features that enhance the overall use and performance of your Mac, but the bottom line is how well they recover data that's disappeared from your hard disk.

In our tests, Norton Utilities, SUM II, MacTools, and 911 all performed better when installed prior to a crash, reinforcing our belief that all Mac users should get a recovery program while their system is in working order. You may never have had a data-corruption problem, and your hard drive may be humming along contentedly, but — like death and taxes — a crash is inevitable. Read "The Bottom Line," buy the program that best meets your needs, and install it the minute you get it home. If you don't and if your hard-disk drive drops dead tomorrow morning, don't say we didn't warn you.

Paul Wolf accidentally deleted this article, and Jackie Taylor recovered it.

The Bottom Line

You depend on your hard-disk drive. You can't afford to have it fail and lose your data. You should back up often and be prepared for an eventual software or hardware failure. If your hardware fails, there's nothing more to do than send your drive back, hope your warranty is up-to-date, and trust that your most recent backup is recent enough. But failures are usually caused by software problems or user errors, and a recovery program can save you valuable time and data.

We strongly recommend Symantec's **Norton Utilities for the Macintosh** ($129) for anyone using a hard disk. With Norton's File Saver INIT installed, Norton Utilities performed more recoveries than any of the other utilities we tested and its recoveries were more complete. Without the INIT and preinstallation, Norton Utilities still recovered a higher percentage of files overall. The on-line help was thorough and even fun to use. Besides being the most reliable recovery program, Norton Utilities provides extras, such as Fast Find and Directory Assistance, that are practical and convenient enhancements to the Mac's system software.

If you're a network administrator or MIS director with a department relying on you to save its data, you need all the tools you can get — you may want to have more than one hard-disk-recovery program on hand. Although Norton Utilities is our overall top choice, Symantec's other recovery program, **SUM II** ($149.95), recovered data almost as well. With its Mirror INIT installed, Central Point Software's **MacTools Deluxe** ($129) recovered files as well as Norton Utilities did in all tests. Without preinstallation, MacTools did better in the Erase Disk and Delete Files tests than all the other utilities, but its performance in most corruption tests was unsatisfactory. Microcom's **911 Utilities** ($149.95) might be the last number you want to call if your hard disk is having trouble — it had little luck in recovering our test files.



If your hard disk has crashed, turn to Norton Utilities (center) rather than the other recovery programs: MacTools(left), SUM II (top), and 911 (right).

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Table 1: Features of Hard-Disk-Recovery Programs

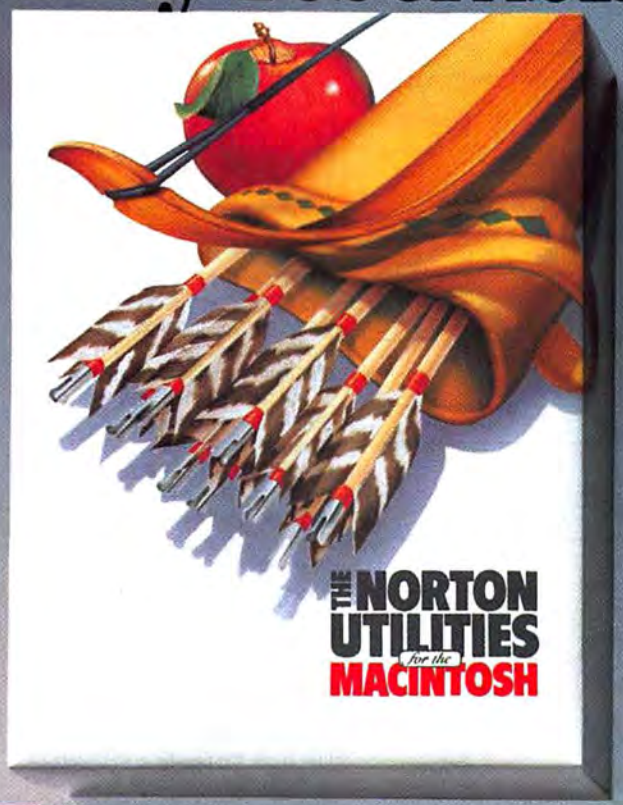
● = yes ○ = no	Apple Disk First Aid $	Central Point Software MacTools Deluxe $$½	Microcom 911 Utilities $½
List price	NA	$129	$149.95
Pros	Free. Diagnoses some problems and fixes minor ones.	Recovers deleted and erased files well if preinstalled.	Undeletes files in place and has good troubleshooting guide.
Cons	Limited recovery abilities.	Mediocre overall performance.	Worst recovery performance. Difficult interface.
Panic performance	good	good	poor
Configuration			
Size of basic application	39K	349K	177K
Minimum memory configuration	1 MB	1 MB	1 MB
Hard-disk functionality			
Back up data structures	○	●	●†
Undelete files			
Not preinstalled	○	●	○
Preinstalled	NA	●	●
Recover from Erase Disk			
Not preinstalled	○	●	○
Preinstalled	NA	●	○
Fix disk in place			
Not preinstalled	●	●	○
Preinstalled	NA	●	●§
Recover to second hard disk	○	●	●
Recover to floppies	○	●	●
Diagnose disk	●	●	●
Generate reports	○	○	●
Floppy functionality			
Recover files	NA	●	●
Diagnose disk	●	●	●
Package			
Backup utility	none	MacTools Backup	none
Virus protection	none	none	Virex
Disk optimizer	none	MacTools Optimizer	none
Disk/sector editor	none	MacTools FileEdit	none
Other software	NA	MacTools Launcher, Locate, Secure, FastCopy, Partition (soft partitioning), CPS TagFix	Sector Collector Cache Flow, Minor Repairs Soft Lock
Technical support	no	yes	yes
Warranty	none	30 days*	90 days*
	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	Central Point Software 15220 N.W. Greenbrier Pkwy. Beaverton, OR 97006 (800) 888-8199	Microcom P.O. Box 51489 Durham, NC 27717 (919) 490-1277, ext. 921

*Money-back guarantee

†Backs up volume-information block only

§Undelete only

Any resemblance to other Macintosh utilities is pure coincidence.



If that sounds like an outrageous statement, it sure is.

But then, this is one outrageous set of utilities.

In fact, comparing the Norton Utilities® for the Macintosh® to anybody else's utilities for the Macintosh is, well, kind of embarrassing.

Because when it comes to fixing your disk problems, rescuing your data and daily getting the utmost from your Mac,® nobody else even comes close.

Why you need a Doctor in the house.

To see what we mean, see what happens when you call up our revolutionary *Norton Disk Doctor.*®

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Which is one reason why—unlike other programs—we don't display hair-raising messages warning you of the "Risk of losing data" from using our utilities.

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You can UnErase by File Type. By Text Search. Or use Quick UnErase to scan your fully loaded hard drive in as little as five seconds.

(You don't even want to know how long it takes everybody else.)

Whether your drive is fully loaded or nearly empty, *Speed Disk*™ is —here we go again—the quickest, easiest and safest way to dramatically accelerate disk access.

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What a find.

Of course, you don't have to lose your data to want to get at it as quickly as possible.

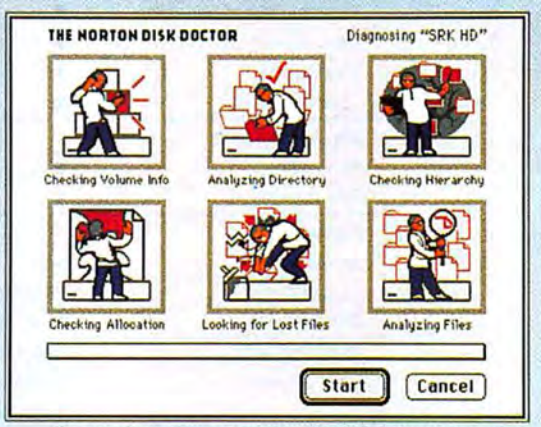
That's something you want to do every day, every time you open a file.

So you'll be interested to know that *Fast Find* locates and opens files so quickly, you may never use the Mac's standard Find File accessory again.

If all of this looks too good to be true, see your favorite software dealer for a demonstration.

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Total times to recover a reformatted 40MB Quantum internal hard drive on a Macintosh IIcx with respective volume information files installed.

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Table 1: Features of Hard-Disk-Recovery Programs, continued

● = yes ○ = no	Symantec Norton Utilities for the Macintosh $$$$½	Symantec SUM II $$$½
List price	$129	$149.95
Pros	Very easy to use, fast. Recovers the most data. Fixes files in place.	Recovers files in most situations.
Cons	Sometimes indicates that it has fixed something it hasn't.	Dfficult interface. Hard to install.
Panic performance	very good	poor
Configuration		
Size of basic application	629K	368K
Minimum memory configuration	1 MB	1 MB
Hard-disk functionality		
Back up data structures	●	●
Undelete files		
Not preinstalled	●	●
Preinstalled	●	●
Recover from Erase Disk		
Not preinstalled	●	●
Preinstalled	●	●
Fix disk in place		
Not preinstalled	●	○
Preinstalled	●	●
Recover to second hard disk	●	●
Recover to floppies	●	●
Diagnose disk	●	●
Generate reports	●	○
Floppy functionality		
Recover files	●	●
Diagnose disk	●	●
Package		
Backup utility	none	SUM BackUp
Virus protection	detects only	none
Disk optimizer	Speed Disk	SUM TuneUp
Disk/sector editor	Norton Disk Editor	Sum Tools
Other software	Directory Assistance, DiskLight, Fast Find, KeyFinder, Layout Plus	SUM Encrypt, QuickCopy, SUM Partition (soft partitioning)
Technical support	yes	yes
Warranty	30 days*	30 days*
	Symantec Corp. 10201 Torre Ave. Cupertino, CA 95014 (408) 253-9600	Symantec Corp. 10201 Torre Ave. Cupertino, CA 95014 (408) 253-9600

*Money-back guarantee

Criteria

List price — The list price is the manufacturer's suggested retail price. Actual street prices may be lower.
Panic performance — How helpful the program and its manual are in recovering your crashed disk.
Size of basic application — Size of the recovery application (not including INITs or utilities).
Minimum memory configuration — All the recovery packages we tested require at least 1 megabyte of RAM.
Back up data structures — Can the program back up a volume's data structures to facilitate recovery later?
Undelete files — Can the program recover files on the hard disk that have been dragged into the Trash?
Recover from Erase Disk — Can the program recover files after the hard disk has been erased with the Finder's Erase Disk command?
Fix disk in place — Can the program repair the disk's data structures, returning the disk to its precrash condition, or do the files have to be recovered to another volume?
Recover to second hard disk — If the program can't fix the disk in place, can it recover files to another hard disk?
Recover to floppies — If another hard disk is not available, can the program recover files to multiple floppy disks?
Diagnose disk — Does the program indicate what is wrong with the hard disk?
Generate reports — Can the program create a report of the recovery process and results?
Recover files — Can the program recover files from a floppy disk to another volume?
Diagnose disk — Does the program indicate what is wrong with the floppy disk?
Backup utility — Does the recovery package include a utility that copies files from a hard disk to another volume for safekeeping?
Virus protection — Does the package include a program that diagnoses, repairs, and prevents virus infections?
Disk optimizer — Does the package include a program that defragments files and organizes them for optimal hard-disk speed?
Disk/sector editor — Does the package include an editing utility that allows you to examine and manipulate data at the sector level?
Other software — What other software is included in the package besides any in the above categories?



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External	$299	$339	$399	$369	$399	$459	$569	$669	$849	$899	$1,695	$2,995	

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BUILDING A BETTER NETWORK WITH EtherTalk-to-LocalTalk Routers

Around the world, around the block — or maybe just around the watercooler — the right router can supercharge your network. But there's more to consider than speed alone.

BY
KURT VANDERSLUIS,
PAUL KENT,
AND THE
MACUSER LABS
STAFF

Remember those carefree networking days of old? Because the Mac came with its own network protocols (AppleTalk) and its own network connections (LocalTalk), it was easy to share a LaserWriter among the dozen or so Macs in your department. You just plugged in a few feet of cable and attached some LocalTalk connectors. Soon, however, the folks in finance down the hall wanted to use *your* LaserWriter to print *their* monthly reports, so they hooked *their* LocalTalk cable up to *your* LocalTalk cable. Your network instantly doubled in size — and ground to a halt because of the increased load.

But wait, there's a solution: a router — or a pair of routers. Rather than plug all those Macs into one large network, you can keep each group distinct — and more efficient — by using a router to connect your department's network with finance's network. And finance to sales, and sales to marketing, and marketing to design, and so on. You've just created an *internet* — a network of networks.

PHOTOGRAPHY: FRED STIMSON


MacWay 500
Shiva
Farallon
PhoneNET Liaison
PhoneNET Liaison
PhoneNET Liaison
ComTalk

EtherTalk-to-LocalTalk Routers

To further enhance overall network performance, you can connect LocalTalk networks to an Ethernet *backbone* running AppleTalk protocols (an EtherTalk network). This central network can connect tributary networks and can move data at 10 mbps (megabits, or millions of bits, per second), compared with LocalTalk's sluggish 230 kbps (kilobits, or thousands of bits, per second). All you need is a pair of EtherTalk-to-LocalTalk routers — one to jump onto the EtherTalk network and one to jump off.

An Ethernet backbone provides the networking equivalent of a superhighway between two small towns. Data zips along on the Ethernet freeway and slows down on the single-lane roads in the towns. An EtherTalk-to-LocalTalk router provides the accelerator or brakes for negotiating between the two types of roadway (see "Are You Ready for Ethernet?," June '90, Buyer's Guide, page 20).

In addition to simple routing — segregating traffic among the networks that make up an internet — some routers provide other functions, such as *gateway* entry into non-AppleTalk environments (TCP/IP [transmission control protocol/internet protocol] and DECnet, for example), dial-up access, and WAN (wide-area networking) over telephone lines or satellite hookups. A router can enable file sharing, printer sharing, and terminal communications between AppleTalk and other network protocols. Even if your network consists of only two Macs, if they are on Ethernet, you'll need an EtherTalk-to-LocalTalk router if you plan to print with your LocalTalk-only LaserWriter ever again.

Before buying a router, you need to analyze your existing internet and anticipate future needs. Gaze into your

Network Glossary

AppleTalk: Apple's set of specifications that describes network hardware, software, and protocols and lets an assortment of Mac and non-Mac devices communicate over a variety of transceivers and media. The specifications were upgraded in AppleTalk Phase 2 (announced in June 1989), which removes some of the limitations of the original AppleTalk, referred to as Phase 1.

bandwidth: the information-carrying capacity of a communication link.

bridge: a device that connects two or more network segments. The bridge passes packets between segments, based on node-address information and/or any filtering criteria established by the network manager.

daemon: a background UNIX process that performs a utility function, such as print spooling.

DECnet: Digital Equipment's set of network specifications for use with its minicomputers and workstations.

EtherTalk: an implementation of low-level AppleTalk protocols that communicates on Ethernet.

Ethernet: a specification for a local-area-network transceiver, protocol, and cabling running at 10 megabits/second.

file server: a computer/hard-drive/software configuration that lets network users share files and applications on the hard disk.

gateway: a device that translates protocols between two types of networks, such as AppleTalk and TCP/IP. Also can refer to a device that provides routing between two or more TCP/IP networks with different network numbers.

hub: a multiport repeater, usually with intelligence and/or network-management capability. Also called a *concentrator*.

internet: a system of distinct physical networks connected by routers and gateways.

LAN (local-area network): a group of connected computers and shared peripherals residing at a specific location.

LocalTalk: 1: an inexpensive, 230.4-kbps implementation of AppleTalk that is native to all Macintoshes. **2:** the cabling system that is used to connect devices using this network technology, including Apple's connectors and cabling and Farallon's PhoneNET system or similar connector hardware.

network: a group of computers and shared peripherals connected in a continuous cabling system. In an AppleTalk internet, the boundaries of a network are defined by routers and gateways.

node: any device on a network that can independently send or receive information and has a network address. (Devices such as modems are usually not nodes.)

protocols: a set of rules that govern the communication and interaction of nodes on a network. *Low-level* protocols define transmission rates, data-encoding schemes, physical interfaces, the method by which nodes contend for the chance to transmit data over the network, and network-addressing schemes. *High-level* protocols define user-oriented functions such as printing and print spooling; file sharing; and the association of Chooser names with printers, servers, and other shared network devices.

repeater: a device that extends the maximum physical length of a network by amplifying and/or retransmitting signals between network segments. Repeaters usually have no bridging or routing capability, and they have a maximum delay between network segments of a few bits.

router: a device that connects two or more networks and intelligently decides the most efficient route for data passing from one network to another. Multiprotocol routers can handle this job simultaneously for two or more protocols.

services: shared network resources — such as file sharing, print spooling, and E-mail — available to all users.

TCP/IP (transmission control protocol/internet protocol): a set of standard, nonproprietary protocols standard on most UNIX devices and used by many other computing devices as well.

TokenTalk: the low-level protocol that lets AppleTalk data be transmitted by use of token-ring hardware.

token ring: a ring of devices that passes a sequence of bits called the *token* from node to node to determine which device can transmit data on a network.

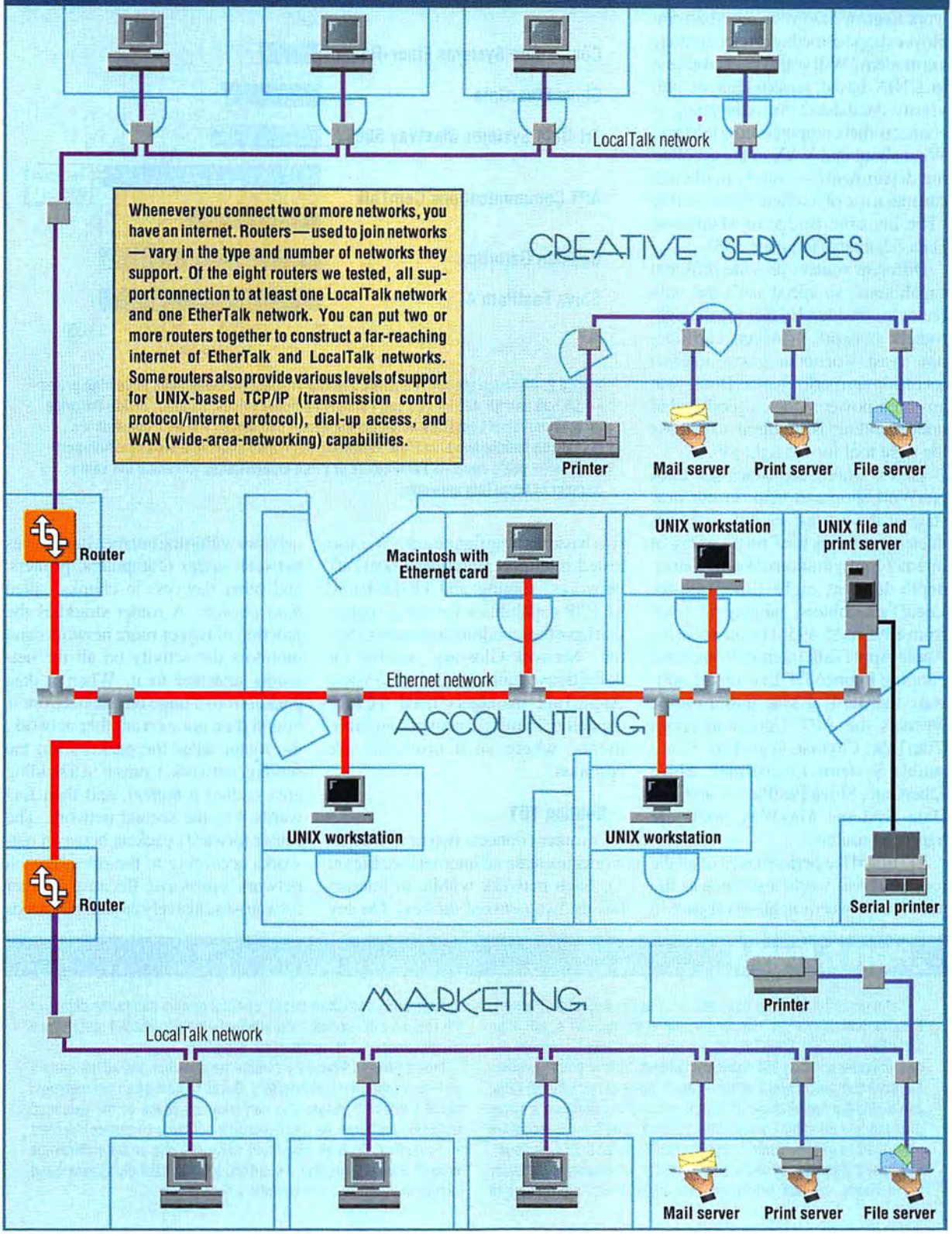
topology: the physical layout of a network.

transceiver: hardware that can simultaneously send and receive network signals.

UNIX: a multiuser, multitasking operating system used by a variety of computers.

WAN (wide-area network): a group of computer networks connected over long distances, often using telephone lines and satellite transmission.

Figure 1: A Typical Corporate Internet



crystal ball and ask lots of questions: How much do you expect your network to grow? Do your suburban employees hope someday to telecommute via modem? Will you ever need access to UNIX-based government or university databases? Are you going to connect other computers beside Macs? What about that VAX in the accounting department? — surely marketing can make use of its client database (see "The Invisible Bridge to Mainframe Data," January '91, page 138).

Different routers provide different capabilities, so speed isn't the only factor to consider. By picking the right routers, network managers can fine-tune a vast — or not-so-vast — internet for maximum performance. But as with any high-powered tool, a good deal of understanding is required to choose the right tool for the right job.

That's where the MacUser Labs NetWorkShop can help. In our new state-of-the-art test facility, we conducted extensive tests on a variety of internet configurations. We took an in-depth look at eight EtherTalk-to-LocalTalk routers, ranging in price from $395 to $5,495. The inexpensive Apple AppleTalk Internet Router and Farallon PhoneNET Liaison are software that turns a Mac into a router, whereas the APT Communications ComTalk, Cayman GatorBox, Compatible Systems Ether•Route, Shiva EtherGate, Shiva FastPath 4, and Tri-Data Systems MaxWay 500E are hardware routers.

We timed the performance of all the routers in real-world tests such as file transfers between client/server pairs in two basic test configurations. We also tested multiport (multiple LocalTalk networks) routing and UNIX-based TCP/IP capabilities for those routers that have these additional features. (See the "Network Glossary" sidebar for definitions of unfamiliar terms.) Many AppleTalk managers need TCP/IP capability in mixed-network environments, where such protocols are common.

Figure 2: Cost per LocalTalk Network Connection

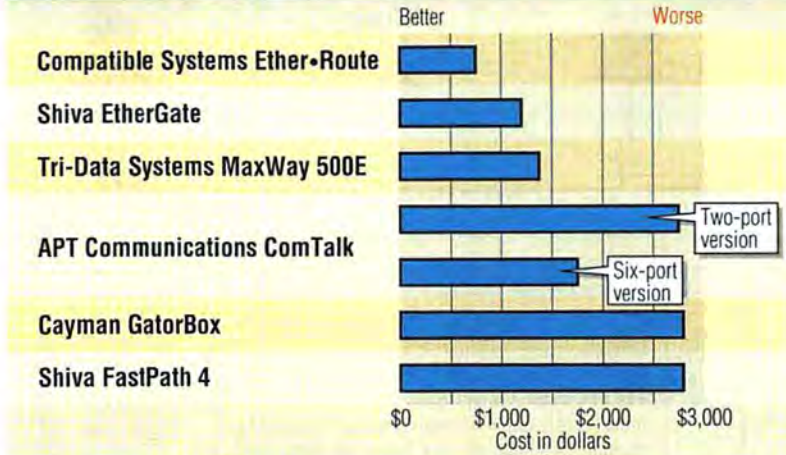


Figure 2: Although the APT ComTalk and the Tri-Data MaxWay 500E have high prices — $5,500 and $5,495 — you can't simply compare prices. Instead, divide the price by the number of LocalTalk networks the router can serve. The APT ComTalk we tested can handle two LocalTalk networks, but it also ships in a six-LocalTalk-port version — you'd need six FastPath 4s or three Ether•Routes to handle the same number of LocalTalk networks.

Routing 101

A router connects two or more networks to create an internet (see Figure 1). Each network within an internet has its own *network address*. On any network within the internet, data moves between *nodes* (computers, printers, and other devices) in chunks called *data packets*. A router straddles the junction of two or more networks and monitors the activity on all the networks attached to it. When a data packet from a node on one network is bound for a node on another network, the router takes the packet from the sending network, stores it in a holding area (called a *buffer*), and then forwards it to the second network. The router forwards packets between networks according to the rules of each network's *protocol*. Because a router forwards exclusively the data that needs

Phase 2, Round 3

Even powerful Ethernet has limitations under AppleTalk Phase 1. Despite having greater bandwidth and transmission speed than LocalTalk, Phase 1 EtherTalk allows only one network number per network cable and only 254 nodes per network. Your internet's growth, then, is a constant concern. Under Phase 2, however, an Ethernet cable can support a broad range of logical network numbers on a single physical network cable. Theoretically, Phase 2 EtherTalk can recognize more than 16 million nodes. LocalTalk is still limited to 254, however.

Phase 2 also streamlines router-to-router communications. Every ten seconds, routers broadcast network-address information (a routing table) onto the internet. Phase 2 routers handle the details of this routing-table update more efficiently than do Phase 1 routers (see "Finally Phase 2," November '89, page 248).

Mixed Phase 1/Phase 2 internets are possible, and all the routers we tested support mixed internets. But all routers on an internet must support Phase 2 before you can take advantage of the extended addressing scheme. As more managers of large corporate internets try to connect all their dispersed networks into an enterprisewide internet, Phase 1's limitations will become increasingly apparent and migration to Phase 2 will become a necessity.

forwarding and keeps all other network activity confined to the network on which it originated, the traffic level in each of the networks remains at a reasonable level.

A router keeps track of network information in its *routing table*. Once in service, routers periodically exchange routing tables with each other, thus keeping a dynamic and accurate picture of how the internet is constructed. This periodic — every ten seconds — exchange creates a small amount of background traffic in addition to the data that is traversing the internet. A routing table must be constructed for each protocol for which the router is responsible, and each protocol creates its own level of background traffic.

The larger the internet and the greater the number of routers and different protocols, the greater the background traffic. In an effort to reduce such overhead or simply to make use of existing cabling and protocols, many network managers incorporate their LocalTalk networks into existing Ethernet backbones running TCP/IP protocols. TCP/IP is especially well suited to large internets.

IP functionality in AppleTalk routers comes in a few different flavors (see the "TCP/IP and AppleTalk" sidebar). Both the Shiva FastPath 4 and the Cayman GatorBox can route packets by using TCP/IP protocols, and more vendors are providing this capability (see the "On the Horizon" sidebar).

Router Features

Before thinking about TCP/IP, though, you might simply want to get your AppleTalk networks — whether LocalTalk or EtherTalk — under better control. Software routers, which run in the background on a Mac, are an especially economical option when you have an older Mac that you want to retire from its current service. You might, for example, install EtherTalk cards into two software-router-equipped SEs to add an EtherTalk backbone to your LocalTalk internet. Alternatively, you can combine routing with an existing file or mail server. Combining a server with a router has the advantage that traffic coming to the server from either of two networks won't affect the other network (see "Work Groups or Work Teams?" October '90, page 234). But don't consider using a software router in the background of someone's workstation. Although such penny-pinching is technically possible, a system crash on that workstation can cause the loss of the router capability — and mess up everyone's access to network resources at the same time.



Figure 3: You must plow through three screens to reach this dialog box to change from thin Ethernet to thick Ethernet cable or to change from AppleTalk Phase 1 to Phase 2 — but EtherGate's software is not any more convoluted than that of other routers.

Another advantage of software routers is that they have multiport capability. Because AppleTalk Internet Router and Farallon PhoneNET Liaison both run on Macs, they can use the Mac's two built-in ports (the Macintosh's printer and modem port can both be used for LocalTalk networking) for routing among two LocalTalk networks. In addition, both software routers support multiple Ethernet and token-ring networks. PhoneNET Liaison lets you put up to three network cards in your Mac, whereas AppleTalk Internet Router can support up to six additional network cards (the maximum number of slots available in a Mac II, IIx, or IIfx).

For more than two LocalTalk networks, look to a hardware router. The APT ComTalk ships in 40 different configurations, including one with one EtherTalk and six LocalTalk networks. The model we tested was configured for one EtherTalk and two LocalTalk ports. The Tri-Data MaxWay 500E serves one EtherTalk and four LocalTalk networks.

The Shiva FastPath 4 and Cayman GatorBox are the only routers we tested that have just one LocalTalk port each — if you want to connect 200 LocalTalk networks with either of these, you'll need 200 FastPath 4s or GatorBoxes, which may not be efficient or economical (see Figure 2). You'd need only 40 or 50 ComTalks or MaxWay 500Es. The Shiva EtherGate, Farallon PhoneNET Liaison and APT ComTalk also enable dial-up access, for wide-area networking.

Installation and Configuration

Whether you choose a hardware or a software router, you must correctly install its *configuration software*. You must also provide network information — network addresses, for example — that's specific to your internet. And, of course, you must physically connect the network cables to the router. With a software router, these connections are to ports in your Mac — to the LocalTalk port, say, and to an EtherTalk card in one of the Mac's slots. With a hardware router, you make the connections to ports in the box itself.

Then you let the router know what kind of cable — thick or thin coaxial — is attached to it. This can be tricky. For example, you must open the Ether•Route's case and move a jumper to change from thick to thin Ethernet. Fortunately, Compatible Systems will ship the Ether•Route configured

Figure 4: Router Performance

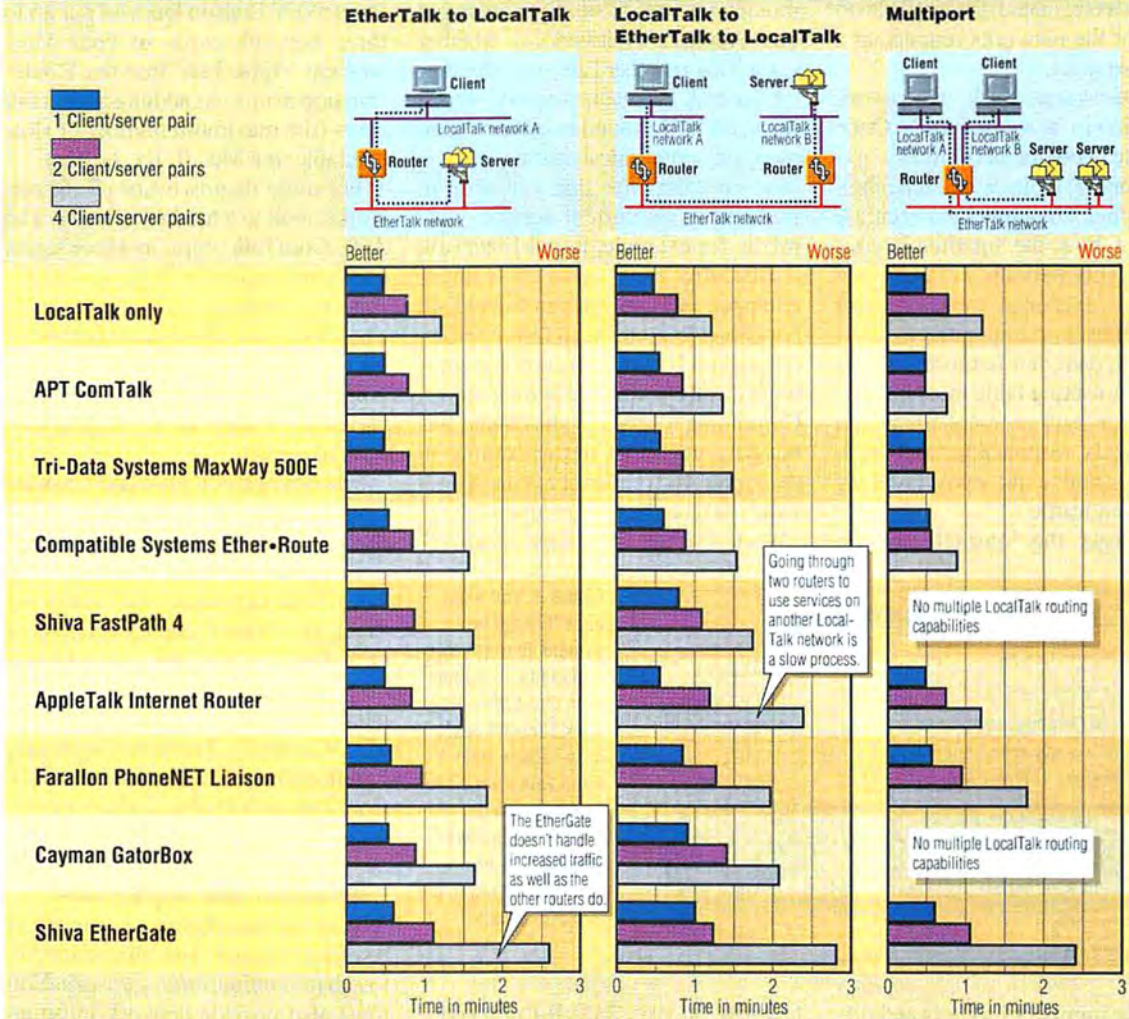


Figure 4: We transferred 500K files between 5-megabyte Mac IIcx AppleShare client/server pairs. We repeated the tests between one, two, and four client/server pairs — in the four-client/server test, for example, we copied files from four different servers on one network to four different clients on a separate network. To test the software routers, we ran the same tests, using Mac SE/30s with Asanté Ethernet cards to run the routing software. We ran these time trials on three different network configurations — EtherTalk to LocalTalk, LocalTalk to EtherTalk to LocalTalk, and multiport — to test each of the routers:

EtherTalk to LocalTalk:

This is a common routing model: many small LocalTalk networks sharing services that reside on an EtherTalk network. File transfers between a client and server on the same LocalTalk network are faster, than with any of the routers, however, so unless users on other LocalTalk networks need a service — a printer or server, for example — keep clients and servers together. If you do need to share services on EtherTalk with many LocalTalk networks, the Tri-Data Systems MaxWay 500E, APT ComTalk, and AppleTalk Internet Router are fastest at routing in this model.

LocalTalk to EtherTalk to LocalTalk:

Our second platform timed routing from one LocalTalk network to another LocalTalk network via EtherTalk. This setup doesn't show especially good network utilization, but occasionally you may need to access services on another LocalTalk network — to use another department's LocalTalk printer, for example. The results show why you won't want to do this frequently — transfer time among routers is dramatically different as the number of client/server pairs increases. The APT ComTalk, Tri-Data Systems MaxWay 500E, and Compatible Systems Ether•Route turned in the best performance in this scenario.

Multiport:

The fewer devices on LocalTalk, the better, as the results of this test prove. We spread the clients among two LocalTalk networks (in the multiple-client/server-pair tests) and found that overall speed does not diminish as dramatically as it does when all clients are on one LocalTalk network. The APT ComTalk, Tri-Data Systems MaxWay 500E, and Compatible Systems Ether•Route again fared the best, with virtually no increase in file-transfer time for the second client/server pair.

according to your specifications. The Tri-Data MaxWay 500E requires that you slide the entire interface board out of the case — quite a chore. The Shiva FastPath 4 is the only router that has a simple switch conveniently located on the outside of the case.

Both the EtherGate and the GatorBox, on the other hand, let you make this setting in software (see Figure 3). Setting the cable type in software might sound less intimidating, but we found it no less daunting a task. With the EtherGate, we had to wade through three screens just to get to the dialog box for setting this switch.

Given the complexity of the installation and configuration tasks, a good manual is a must. The PhoneNET Liaison and AppleTalk Internet Router have excellent manuals that guide you through the setup process. The GatorBox manual provides a glossary that is well worth reading to get a handle on some of the language and technical details of AppleTalk networking. The Ether•Route manual is unimposing but well organized.

Testing

All the routers we tested are *AppleTalk Phase 2-compliant*. Since Apple introduced Phase 2 in 1989, more and more corporate sites have been taking advantage of its ability to support larger internets, making Phase 2 support an essential feature of state-of-the-art routers (see the "Phase 2, Round 3" sidebar).

EtherTalk-to-LocalTalk routers are used in two primary network configurations: a file, mail, or print server is located on the Ethernet cable, or a

TCP/IP and AppleTalk

Your company's creative services and advertising departments have just installed Macintoshes and have created their own small LocalTalk networks. Creative services, however, occasionally needs files from the advertising department. You can simply connect the cables and create one big, slow network, or you can add these two new networks to your corporate backbone (major institutionwide data cable). However, your backbone isn't running LocalTalk — it's running TCP/IP.

No problem — if you use an EtherTalk-to-LocalTalk router with TCP/IP capability. TCP/IP is not a vendor set of protocols, as is AppleTalk, but a protocol standard designed by the joint effort of government and scientific agencies specifically for large networks — the protocols function efficiently even with 100,000 nodes.

In this LocalTalk-to-TCP/IP-to-LocalTalk example, the only TCP/IP capability you need is the ability to make an *IP tunnel*. IP tunneling moves AppleTalk data between two routers that can use TCP/IP (such as the Cayman GatorBox and the Shiva FastPath 4) by *encapsulating* the AppleTalk data.

A tunnel is created when a UNIX-configuration host running TCP/IP executes a process called atalkad (the AppleTalk administration daemon), which provides tunnel information on demand to any router that requests it. The atalkad process uses a file called atalkatab (the AppleTalk administration table) to define the tunnels by giving the IP addresses and the AppleTalk numbers and zone names for the two ends of the tunnel. The network administrator must configure atalkatab and atalkad manually (not an easy task), but once you've gotten the TCP/IP-tunnel information configured and running, it operates transparently.

Our tunnel test platform included a Sun SPARCstation IPC host configured with atalkad and atalkatab files. We had a client Macintosh on one LocalTalk network and a server Macintosh on another network (see Figure A). We then used two routers of the same type to connect each of these two networks to an Ethernet backbone that was running TCP/IP.

Testing was the same as it was in our other trials: We copied large files from the clients to the servers and recorded the time the copying process took to complete. We repeated the tests for one, two, and four client/server pairs — for example, during the four-client/server test, we copied files from four servers on one network to four clients on a separate network. The Shiva FastPath 4 was only slightly faster than the Cayman Gatorbox.

Vendors are beginning to add TCP/IP capabilities to their routers, although the level of these capabilities varies among products. For example, if you add GatorShare software ($1,995) to your GatorBox, your company's UNIX host will appear in your Chooser precisely the same way as an AppleShare server does — GatorShare translates UNIX-based NFS (Network File System) to AFP (AppleTalk Filing Protocol). Even if you have no immediate need, you may decide to purchase a router with TCP/IP capability and keep the TCP/IP option open.

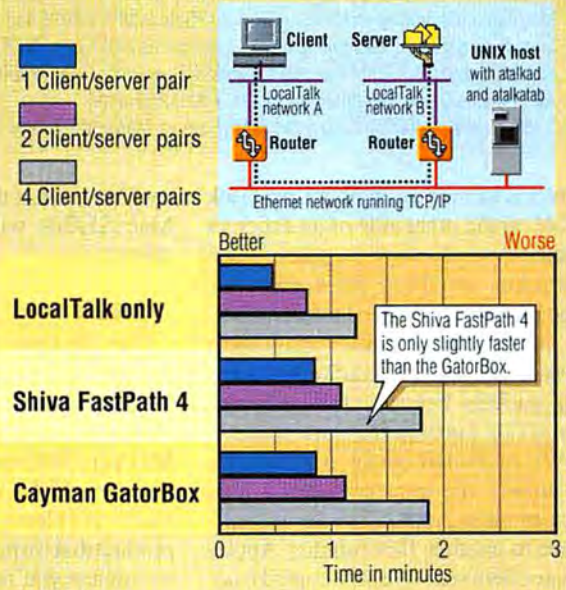


Figure A. You can connect two LocalTalk networks through an Ethernet network running TCP/IP without serious degradation in performance. In fact, the Cayman GatorBox performed better in this test than it did when the Ethernet network was running AppleTalk. Our test platform consisted of two LocalTalk networks connected to an Ethernet network running TCP/IP. We "tunneled" between one, two, and four client/server pairs. The performance of the Shiva FastPath 4 and the Cayman GatorBox was virtually the same.

On the Horizon

We had just pulled the last cable from our patch panel when announcements of upgrades and added features for many products came streaming in.

APT Communications began shipping the ComTalk with new software that supports TCP/IP-gateway functions, including NFS-AFP conversion. ComTalk IP Services software also supports industry-standard MacIP and IPTalk functions, allowing Mac users to establish Telnet or FTP sessions with UNIX or other TCP/IP hosts. Free software upgrades are available for all ComTalks purchased before December 4, 1990. APT Communications, Inc., 9607 Dr. Perry Road, Ijamsville, MD 21754; (301) 831-1182.

Compatible Systems has added TCP/IP capabilities to the Ether•Route. Called Ether•Route/TCP ($1,895), the router's features include support for encapsulation of TCP/IP packets in AppleTalk for routing onto Ethernet as IP packets. Compatible Systems Corp., P.O. Drawer 7220, Boulder, CO 80308; (800) 356-0283.

Also at year's end, JDL Technologies began shipping the Excelerator, an EtherTalk-to-LocalTalk router that ships with four or eight LocalTalk ports and is said to speed up access from a node on LocalTalk to a server on EtherTalk by up to 30 percent (eight ports, $4,995 or education price of $3,195; four ports, $4,395 or education price of $2,695). JDL Technologies, Inc., 3531 Nevada Avenue N., Suite 200, New Hope, MN 55427; (800) 535-4488.

NRC's MultiGate 2000E ($2,395) and MultiGate Mac ($795) are now both Phase 2-compatible. MultiGate Mac is a software router that also has TCP/IP-routing and -encapsulation features. The MultiGate Mac can route among up to six networks. IPGate is NRC's $395 add-on software module that can be downloaded to the MultiGate 2000E hardware router for TCP/IP support. Network Resources Corp., 2450 Autumnvale Drive, San Jose, CA 95131; (408) 263-8100.

Shiva announced an upgraded EtherGate at Macworld Expo in early January, promising speed gains and adding fragmentation for TCP/IP support. Shiva, One Cambridge Center, Cambridge, MA 02142; (800) 458-3550 or (617) 252-6300.

Webster Computer's MultiPort Gateway ($4,995) is Phase 2-compatible and features four LocalTalk ports, one EtherTalk port, and TCP/IP support. Webster Computer Corp., 2109 O'Toole Avenue, Suite J, San Jose, CA 95131-1303; (408) 954-8054.

Network management often involves using a collection of loosely related hardware and software. Some of the larger network vendors have come to the rescue with a modular, integrated — that is, one-vendor — solution: a network chassis, about the size of a small refrigerator, into which you plug network modules — Ethernet, token ring, LocalTalk, whatever you need. The entire network can then be managed and controlled from this single device with an integrated network-management tool.

Many network managers will prefer this approach to the cornucopia of solutions currently available, but the disadvantages are worth noting: Once you've picked one of these integrated systems, you're pretty much locked in to that vendor — switching to another vendor's product will defeat your design goal of an integrated solution. The Access/One Enclosure series from Ungermann-Bass, for example, is such a plug-and-play network solution. Access/One comes in a 5-slot model ($2,095) and an 11-slot model ($2,495). The Access/One MaxTalk Interface Module ($4,695) is the AppleTalk component — it supports 16 LocalTalk networks and simultaneously supports the AppleTalk and TCP/IP network protocols. It performs the function of a LocalTalk hub (such as a StarController) and an Ethernet router (such as the FastPath 4). NetDirector ($7,500 to $16,000) is Ungermann-Bass' management software for the Access/One Enclosure series. Ungermann-Bass, Inc., 3900 Freedom Circle, Santa Clara, CA 05052; (408) 562-7958.

server is located on another LocalTalk cable on the other side of an Ethernet cable. Two of our three primary test platforms simulated these scenarios (see Figure 4). We also looked at router performance under multiport LocalTalk routing conditions — routing packets between two different LocalTalk ports on the same router.

We measured router performance by timing file transfers from a Mac IIcx running AppleShare server software to another IIcx running AppleShare client software. We copied large files from the clients to the servers and recorded the time it took for the copying process to be completed. We repeated the tests for one, two, and four client/server pairs. In the four-client, four-server test, for example, we simultaneously copied files from four servers on one network to four clients on a separate network. To test the software routers, we ran the same tests, using Mac SE/30s with Asanté Ethernet cards.

Results

The Tri-Data MaxWay 500E and the APT ComTalk consistently had the best performance of all the routers. However, even though the Tri-Data MaxWay 500E was often slightly faster than the APT ComTalk, we had so many problems with the Tri-Data product that we hesitate to recommend it — unless you're a seasoned network manager. In fact, we went through five MaxWay 500Es before we could get two of them to work properly. The setup software, which can be run only from LocalTalk, is also very confusing. For example, the screen in which you enter the network range provides no prompts for what to enter. Because the display allows only a four-digit number, perhaps we should have guessed that a hexadecimal number was required, but we didn't. The APT ComTalk is also difficult to set up, but it has powerful network-management software.

If your LocalTalk-network devices are numerous and concentrated — if, for example, you have 150 Macs on LocalTalk in the same building — then the multiport APT ComTalk is an efficient way of dividing up your internet. If you have only 30 devices per building, on the other hand, your internet is probably simpler and the extra expense of the ComTalk or MaxWay 500E is less likely to pay off.

At the other end of the performance scale, the Shiva EtherGate was consistently the slowest router in the field — and it too is confusing to set up. Its configuration software configures the *entire* Shiva product line, except for

the FastPath 4. Although this may at first seem a good strategy, you have to wait a long time for the software to search the network for other members of the Shiva family — NetModems, NetSerials, NetBridges, TeleBridges, and EtherGates — when all you want to do is configure the EtherGate. You also have to move through numerous screens to get to the meat of the EtherGate configuration manager.

If you're considering just local-area services — you don't need dial-up access — then Compatible Systems' Ether•Route is the clear choice. It's fast and easy to set up and configure. The only thing we didn't like about the Ether•Route was that you have to disassemble the box to change it from thick to thin Ethernet.

Both of the software routers we tested — Farallon PhoneNET Liaison and Apple AppleTalk Internet Router — were easy to set up and almost equal in speed, with Internet Router having a slight edge. PhoneNET Liaison has more features, such as dial-up-access capability, and it has the benefit of Farallon's strong technical support. Your dealer must support AppleTalk Internet Router — either wonderful or horrible, depending on your dealer. Also, AppleTalk Internet Router lacks dial-up access.

PhoneNET Liaison is a much more versatile product. You can install it this month in combination with your mail server and then use it next month to provide dial-up access to all those folks who got snowed in over a long weekend. Both software routers have good manuals.

The hottest competition in most people's minds, however, is between the Shiva FastPath 4 and the Cayman GatorBox. The FastPath 4 is a little faster, but the GatorBox is easier to set up. Technical support is about equal, and both handle TCP/IP equally well. The GatorBox with GatorShare software ($1,995) translates UNIX-based NFS (Network File System) to AFP (AppleTalk Filing Protocol) so that a UNIX host looks just like an AppleShare server. If you want or need this capability, you'll buy the GatorBox despite its slightly slower performance.

The FastPath 4 does DECnet routing for communicating with VAXes — if you need that feature, you'll buy the FastPath 4. The GatorBox has a much better manual but can't recover from a power outage as can the FastPath 4. The GatorBox uses volatile RAM and does not have battery backup, whereas the FastPath 4 uses nonvolatile RAM. When the power comes back on after a failure, the GatorBox needs to access its routing software from the Mac that initially downloaded it — and that Mac may not be turned on.

Making the Route Choice

The good news about EtherTalk-to-LocalTalk routers today is that you have a rich set of choices. The bad news is that the choices are complex. Only after you know what features you need can you begin to narrow your choices. The race then comes down to product-to-product, head-to-head competition. For our picks, see the "Bottom Line" sidebar.

If you want a file- or print-server/router combination, then decide between Farallon PhoneNET Liaison and AppleTalk Internet Router. If you have several LocalTalk networks clustered in the same vicinity, choose between the APT ComTalk and the Tri-Data MaxWay 500E. If you want a moderately priced hardware router and don't need TCP/IP, the choice is between the Shiva EtherGate and Compatible Systems Ether•Route. If you need a TCP/IP router, choose the FastPath 4 or the GatorBox. For WAN features in a router, there's the APT ComTalk, Farallon PhoneNET Liaison, or Shiva EtherGate.

Kurt VanderSluis is a *MacUser* contributing editor and AppleTalk-network educator and consultant. Paul Kent does consulting about AppleTalk networks for Winehouse Computer Co.

The Bottom Line

Routers no longer simply transfer signals from one LocalTalk cable to one Ethernet cable. Their repertoire now includes multiple LocalTalk ports, translation of non-Macintosh networking protocols (such as TCP/IP or DECnet), and dial-up access (wide-area networking). Before choosing a router, plan the shape you want your internet to take and decide which — if any — of these additional capabilities you'll need. You'll also want to map out the physical layout of your internet: Do you have a dense grouping of LocalTalk networks on one floor? If so, perhaps one multiport router is a better solution than several single-LocalTalk-port routers. You'll then want to evaluate a router in terms of functions as well as speed.

For straight EtherTalk-to-LocalTalk routing without any frills, we recommend the **Compatible Systems Ether•Route** ($1,495). It's a superior choice if you don't need TCP/IP capabilities. Its ease of use and solid performance are a pleasant surprise in so young a product.

If you need TCP/IP, choose between the **Shiva FastPath 4** ($2,795) and the **Cayman GatorBox** ($2,795). The FastPath 4 is slightly faster, but the GatorBox has better setup information. The FastPath 4 is the only router to include DECnet compatibility, however, so if you need DECnet, it's your answer.

Although it is slightly slower than **Apple AppleTalk Internet Router** ($399), **Farallon PhoneNET Liaison** ($395) wins our vote for the better of the two software routers, because of its versatility — dial-up access, for example. In general, a software router can be an economical solution if you must combine routing with a print, mail, or file server.

Regarding high-end routers, the **APT ComTalk** ($3,250) is flexible in configuration, supports wide-area networking, and has good setup and network-management capabilities. Its abilities more than make up for the slight performance edge of the **Tri-Data MaxWay 500E** ($5,495).

Only one router, the **Shiva EtherGate** ($2,399), gave a bad showing, consistently coming in last in each of our tests. We don't recommend it for use as either a local- or a wide-area router.

EtherTalk-to-LocalTalk Routers

Criteria

Price (list/street) — The list price is the manufacturer's suggested retail price. The street price is an average actual price charged by dealers around the U.S. in January 1991.
Software — The name and version number of the router's controlling software.
CPU — The internal microprocessor.
Type of router code — Upgrades to the router code must be physically installed in the hardware box if the code is in ROM. Routing software that works in RAM is easier to upgrade — there's no hardware to fiddle with. Volatile RAM should have battery backup.
Configuration protection — A password prevents unauthorized access.
Max. number of LocalTalk networks — If you have many LocalTalk networks in one physical location, multiple LocalTalk connections in a single package can ease setup. The more connections per box, the lower the cost per LocalTalk network. Breaking up large LocalTalk networks into smaller work groups can produce more-efficient internets.
Max. number of EtherTalk networks — The cost of the router should also be analyzed in terms of the number of EtherTalk networks that can be connected to it. The more connections per box, the lower the cost per network.
Ethernet-connector type — Thick, or AUI (attachment-unit interface); thin, or BNC coaxial.
Connector-switch type — An external switch lets you set the router for thick or thin Ethernet cable very easily. Some routers have software switches to perform this function.
Gateway functions — Provides access to another type of protocol, such as TCP/IP or DECnet. True gateway functions in a router let you use a host on another type of network just as if it were an AppleShare volume.
Battery backup — If there's a power outage, router code in volatile RAM will be lost if you do not have battery backup.
Phase 2 support — Phase 2 improves routing on AppleTalk networks.
Mixed Phase 1 and 2 — Many large internets are in transition between Phase 1 and 2.
Token-ring capability — AppleTalk implementation of token-ring networking, which is common in PC-compatible environments.
TCP/IP tunneling — A method of communicating between two dispersed LocalTalk networks over TCP/IP without using AppleTalk on the TCP/IP network.
Wide-area networking — Can the router connect networks that are connected over phone or satellite lines?
Hides resources — Can the network manager set up the router so that only certain zones or devices are available to certain users or work groups?
Modem capabilities — Can router users connect to the network via modem?
Dial-in security — Can the router limit dial-in access to the network?

Table 1: Features of Software Routers

● = yes ○ = no	 **Apple AppleTalk Internet Router** ★★★½	 **Farallon PhoneNET Liaison** ★★★★
Price (list/street)	$399/$299	$395/$295
Pros	Fastest software router. Multiple EtherTalk or TokenTalk networks.	Most versatile. Wide-area networking, dial-in capability. Easy installation.
Cons	Does not support dial-in access.	Does not support TCP/IP. Slower than a hardware router.
Version number	2	3.0.1
Features		
Configuration protection	password	password
Max. number of LocalTalk networks	2	2
Max. number of EtherTalk networks*	6	6
Cabling support	thick or thin coaxial, twisted-pair	thick or thin coaxial, twisted-pair
Gateway functions	○	○
Phase 2 support	●	●
Mixed Phase 1 and 2	●	●
Token-ring capability	●	●
TCP/IP tunneling	○	○
Hides resources	○	zones only
Modem capabilities	○	dial-in, dial-out
Dial-in security	NA	password, user authentication
Warranty (media only)	1 year	1 year
Technical support	authorized dealer	unlimited, free
	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (800) 538-9696	Farallon Computing 2000 Powell St., Suite 600 Emeryville, CA 94608 (415) 596-9100

*Limited to number of Ethernet cards in host Mac; maximum is six in a Mac II, IIx, or IIfx.

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*Not compatible with Macintosh 128K or 512K machines.

Please circle 116 on reader service card.



Table 2: Features of Hardware Routers

● = yes ○ = no	 **APT Communications** **ComTalk** ŧŧŧ	 **Cayman** **GatorBox** ŧŧŧ½	 **Compatible Systems** **Ether•Route** ŧŧŧŧ
Price (list/street)	$5,500*/$5,000	$2,795/$1,955	$1,495/$1,045
Pros	A speed demon. Ships in widest variety of configurations.	Gateway features for TCP/IP connectivity.	Fast, solid performance. Easiest to set up and use.
Cons	Software is powerful but difficult to understand.	Only one LocalTalk port. Second-slowest. No battery backup.	Lacks TCP/IP support. Difficult to change cabling-type switch.
Software	APT Internet Manager 5.0	GatorSystem, GatorKeeper 1.6	Ether•Route Manager 1.7.0
CPU	68000	68000	80C188
Features			
Type of router code	ROM, upgradable	volatile RAM	ROM, upgradable
Configuration protection	password	none	password
Max. number of LocalTalk networks	6	1	2
Max. number of EtherTalk networks	1	1	1
Ethernet-connector type	thick†	thick or thin coaxial	thick or thin coaxial
Connector-switch type	NA	software	internal jumper
Gateway functions	none	TCP/IP, Telnet, KIP/CAP, NFS§	none
Battery backup	●	○	●
Phase 2 support	●	●	●
Mixed Phase 1 and 2	●	●	●
Token-ring capability	○	○	○
TCP/IP tunneling	○	●	○
Wide-area networking	●◊	○	○
Hides resources	●	○	●
Modem capabilities	○	○	○
Dial-in security	NA	NA	NA
Warranty	90 days hardware	1 year	1 year
Technical support	toll-free, AppleLink	unlimited, free	unlimited, free
	APT Communications, Inc. 9607 Dr. Perry Road Ijamsville, MD 21754 (301) 831-1182	Cayman Systems 26 Landsdowne St. Cambridge, MA 02139 (617) 494-1999	Compatible Systems Corp. P.O. Box 17220 Boulder, CO 80308 (800) 356-0283 (303) 444-9532

*This price is for the model we tested. Many more configurations, ranging from $3,250 – $12,000, are available.

†Adapter available for thin-coaxial connection.

§Additional software (GatorShare, $1,995) required for NFS.

◊Can be configured for synchronous communications.

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Table 2: Features of Hardware Routers, continued

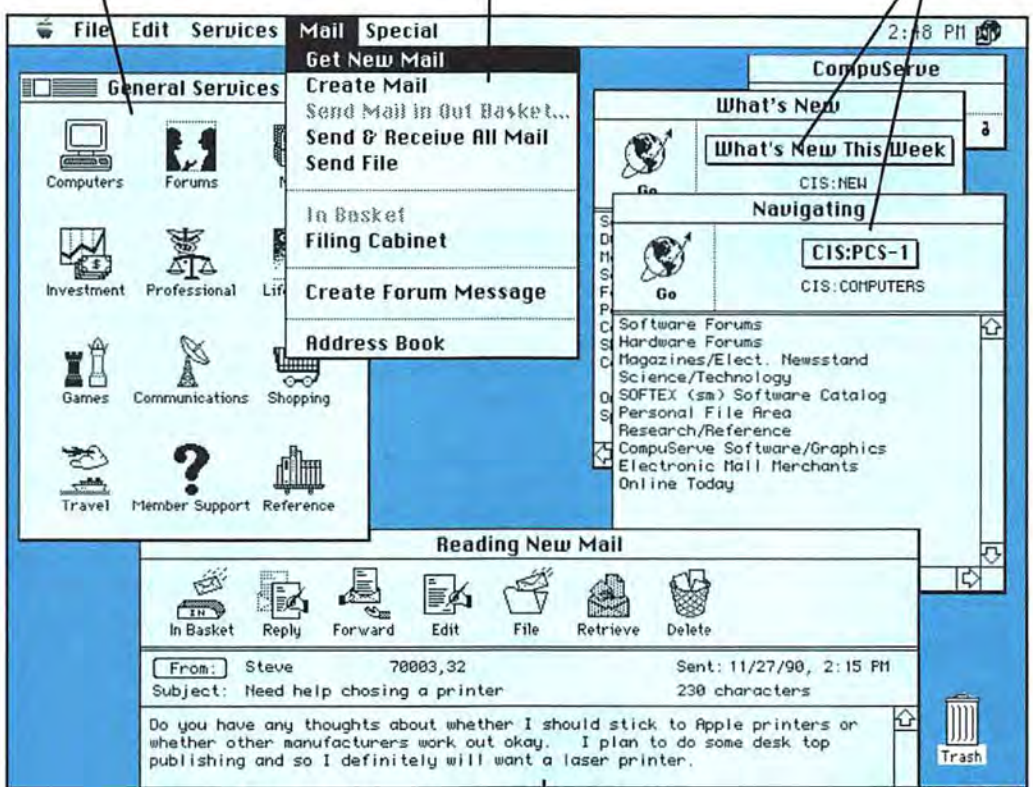
● = yes ○ = no	 **Shiva** **EtherGate** ★★½	 **Shiva** **FastPath 4** ★★★	 **Tri-Data Systems** **MaxWay 500E** ★★½
Price (list/street)	$2,399/$1,625	$2,795/$1,899	$5,495/NA
Pros	Wide-area networking support and dial-in capability.	Only router that supports DECnet.	Second-fastest. Multiple LocalTalk, EtherTalk nets.
Cons	Slowest performance. Software not intuitive.	Only one LocalTalk port.	Doesn't support TCP/IP.
Software	Internet Manager 1.6	K-Star 8.0.1	MaxWay 2.7
CPU	68000	68000	10-MIPS SPARC
Features			
Type of router code	nonvolatile RAM	nonvolatile RAM	ROM, upgradable
Configuration protection	password	none	none
Max. number of LocalTalk networks	2	1	4
Max. number of EtherTalk networks	1	1	1
Ethernet-connector type	thick or thin coaxial	thick or thin coaxial	thick or thin coaxial
Connector-switch type	software	external switch	internal jumper
Gateway functions	none	DECnet, TCP/IP, KIP/CAP	none
Battery backup	●	●	●
Phase 2 support	●	●	●
Mixed Phase 1 and 2	●	●	●
Token-ring capability	○	○	●
TCP/IP tunneling	○	●	○
Wide-area networking	●	○	○
Hides resources	zones only	zones, printers	○
Modem capabilities	●	○	○
Dial-in security	yes	NA	NA
Warranty	1 year	1 year	1 year
Technical support	unlimited, free	unlimited, free	unlimited, free
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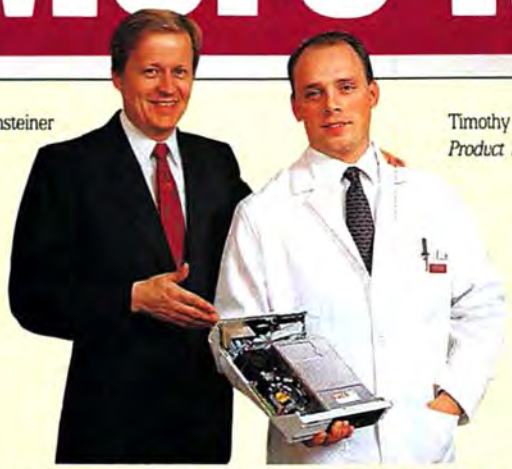
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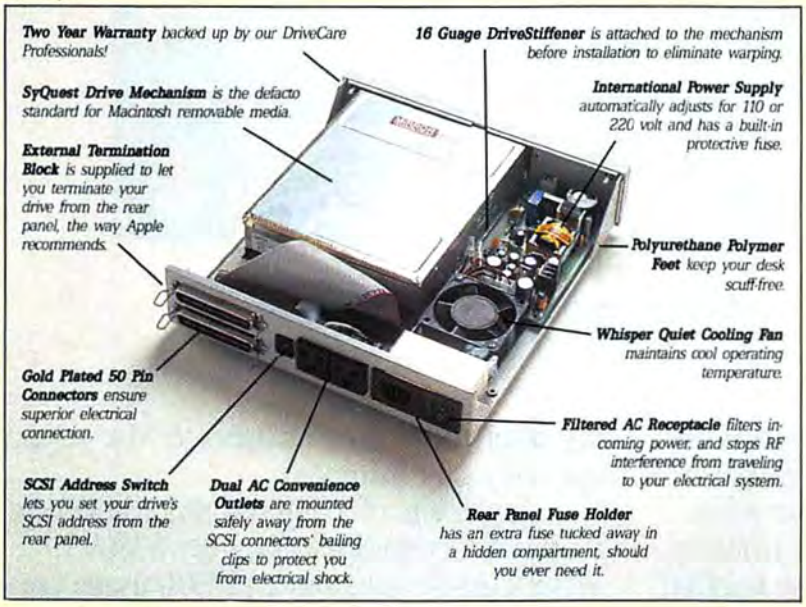
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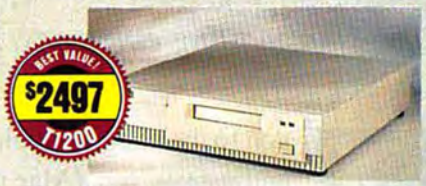
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M45	45Mb	$327	$ 397
M80	80Mb	$427	$ 467
MP80	80Mb	$567	$ 617
MP105	105Mb	$617	$ 667
M130	130Mb	$647	$ 747
M180	180Mb	$767	$ 877
M290	290Mb		$ 1647
M595	595Mb		$2247
RM42	45Mb		$ 617

MP designates a Quantum drive mechanism.

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BY OWEN W. LINZMAYER

MAC TO MAILBOX

Your Mac can help you save on postage and increase your mailing efficiency. Here's how.

Much to the chagrin of electronic-mail enthusiasts, most Mac users resort to a decidedly low-tech service for disseminating information — the post office. First-class mail is quick, relatively inexpensive, and reliable, and it reaches just about everyone. (Let's face it, your Aunt Edna probably can't be reached by E-mail.)

Sure, a pouch of first-class mail lacks the panache of electrons racing toward their E-mail destination. But that doesn't mean you can't use the Mac to automate almost every mailing task, from sending occasional personal correspondence all the way to saturating neighborhoods with direct-marketing materials. Regardless of the volume of mail you generate, there's probably a Mac postal product just right for you. And chances are, you've overlooked ways you can use your existing hardware and software to your best advantage. Here's the lowdown on the many indispensable mailing products currently available plus some tricks that don't cost a penny.

PHOTOGRAPHY: PIERRE-YVES GOAVEC


NEW YORK, NY
Macintosh Classic

Address for Success

Most of the large postal-service facilities have OCR (optical character recognition) machines that can "read" addresses at top speeds of 36,000 envelopes per hour. If the OCR machine can comprehend the address information, the envelope is sorted automatically and sent on the fast track toward its destination. Otherwise the envelope is kicked out and sent down another line where mere humans must try to discern your chicken scratchings. By making sure your mail is OCR-friendly, you can help it avoid this fate, which means that it will be delivered up to a full day sooner. Observing the following 14 rules will help (see Figure A for more on how to address envelopes):

1. Type or print addresses. OCR machines aren't able to read handwritten envelopes, no matter how perfect your penmanship.

2. Use black ink on a white background for the highest contrast.

3. Use a nonornamental, nonproportional, sans serif font such as Monaco. OCR machines must be able to clearly distinguish individual letters, and serifs and run-together cursive fonts such as Los Angeles increase the likelihood of confusion.

4. Don't place any extraneous text or graphics anywhere near the address block.

5. Use all uppercase letters. OCR machines have a harder time reading lowercase characters.

6. Omit all punctuation. If your address information is correct, OCR machines have no need for punctuation.

7. Maintain a uniform left margin for all address information. Some envelope-printing utilities let you center addresses; don't use this option.

Wrong



- Mixed uppercase and lowercase characters
- Punctuation
- Center justification
- Ornamental font
- Missing floor number
- Incorrect state abbreviation
- Incomplete ZIP code
- Recipient's name appears below the ZIP code

Reasons to Automate

If you've been getting along just fine sending out mail by hand, you may think there's no reason to automate the process. Nothing could be further from the truth. The Mac can help you save time, money, and face.

By keeping your list of mail recipients in an electronic format — be it a general-purpose database or a dedicated mail-list manager — you can avoid the tedious, time-consuming task of retyping addresses for each mailing. Once this information is in the computer, just follow a few simple rules and you can have your mail racing down the fast track for rapid delivery (see the "Address for Success" and "Pushing the Envelope" sidebars).

Although it might require an initial investment in some dedicated software and hardware, mailing with the Mac is cost-effective in the long run. First of all, using the Mac makes keeping your address list up-to-date much easier and helps reduce the wasted expense of sending out undeliverable mail. Furthermore, you can take advantage of deep postage discounts by sorting your mail before delivering it to the U.S. Postal Service. Mail that is presorted and pre-bar-coded receives the most favorable rates under the new rate structures that should now be in effect (up to a 7¢ discount per piece of first-class mail). Sorting and bar coding are nearly impossible to do by hand, but a computer can do them in minutes.

Finally, the Mac can help you save face. Beautifully composed letters may slither out of your laser printer in flawless glory, but do you then kiss the professional look good-bye by using either illegible handwriting or a clunky typewriter to address the envelope? Why not address your envelopes with a word processor instead? Not only do printed addresses look better than handwritten ones but you're also less likely to make embarrassing spelling mistakes.

The Electronic Address Book

The first step toward automating your mail is getting your recipients' addresses into an electronic format. For all but the most demanding heavy mailers, a standard flat-file database manager (DAtabase, FileMaker Pro, or Microsoft File, for example) or personal information manager (such as Address Book Plus, Dynodex, or Pastel) should work well.

If you're starting from scratch, you need — at the very least — separate fields for first name, last name, street address, city, state, and ZIP code. (It's important to leave enough room for ten characters in the ZIP-code field, so

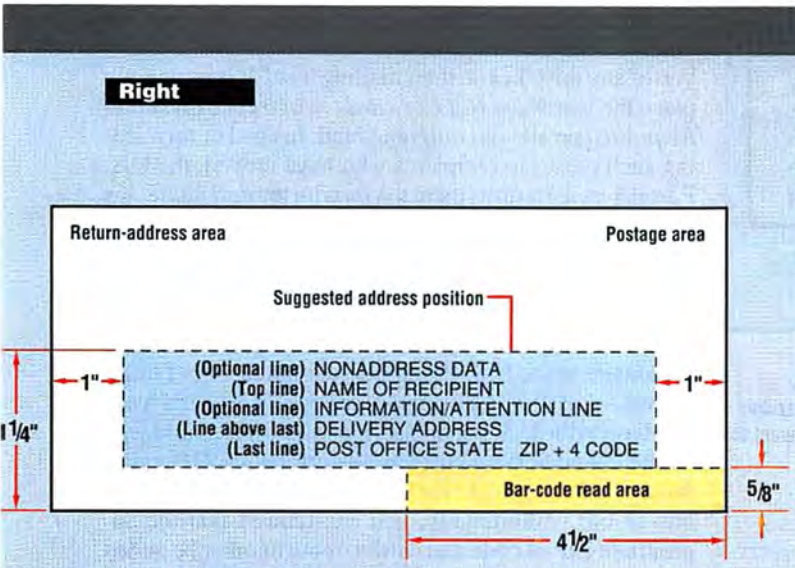


Figure A: *How* you address your mail and *where* you place the address and postal bar code on the envelope can speed up mail delivery — as well as save you money. The newly enacted postal rates give significant discounts to bulk mailers that use bar coding and correct address procedures.

8. Include appropriate floor, suite, or apartment numbers whenever possible.

9. The city, state, and ZIP code should be the bottom line of the address. OCR machines read addresses from the bottom up, so the fewer lines they read, the faster they work.

10. If the letter is going to the attention of someone in a company, place the recipient's name *above* the address information.

11. For pieces with two addresses — such as a street address and post-office box — place the address where you want the mail delivered immediately above the bottom line containing the city, state, and ZIP code.

12. Use standard two-letter state abbreviations with both letters uppercase and no periods.

13. If you're using window envelopes, make sure the recipient's complete address is always visible, even if the insert moves.

14. On each piece of mail, the U.S. Postal Service's OCR machines look up the appropriate ZIP code and then spray the bar code (the binary representation of the ZIP code) on the lower right corner of the envelope. These pieces are then routed to machines that can read bar codes for further mechanical sorting. By adding the bar code yourself, you can avoid one step in the sorting process. This is possible with some envelope printers and printing utilities (see the "Pushing the Envelope" sidebar). Because pre-bar-coded mail requires very little human handling, it's expedited through the U.S. Postal Service facilities. What's more, the new rate structure makes it cheaper to send pre-bar-coded mail. Contact your local U.S. Postal Service account representative for more information.

you have space for the ZIP+4 extension. A separate ZIP-code field also lets you presort your list.) You can either type the addresses into the computer yourself or get a typing service to do the dirty work. If you buy mailing lists, request that the data be provided on-disk, not as labels. Most mailing houses are happy to comply with this request, but they'll probably send you an IBM disk, which means you'll need a 1.44-megabyte SuperDrive (or compatible) to transfer the data to your Mac (more on this later).

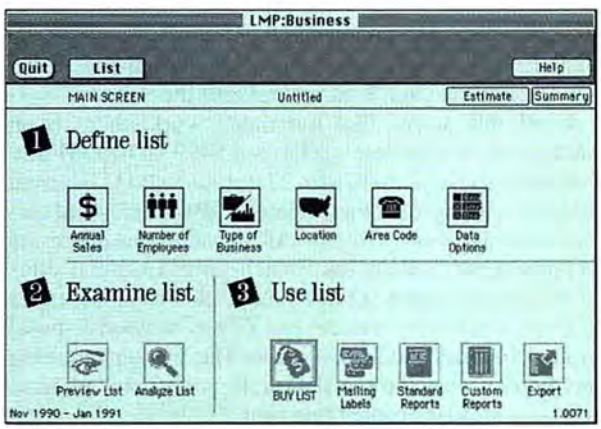


Figure 1: Direct marketers can use the Lotus MarketPlace: Business CD-ROM disc to cull a targeted mailing list from a database containing names, addresses, telephone numbers, and important marketing data on seven million businesses in the U.S.

An alternative to buying mailing lists from mailing houses is to use Lotus Development's MarketPlace family of products, distributed on CD-ROM. Lotus MarketPlace: Business is essentially an enormous database containing names, addresses, telephone numbers, and marketing data on seven million American businesses. The basic package costs $695; for $150 you receive a year's worth of quarterly updates; $400 buys 5,000 additional names. By the time you read this, Lotus should also have released a CD-ROM disc with demographic and life-style data on 120 million consumers in 80 million U.S. households.

Lotus MarketPlace lets you target potential customers, analyze markets, and create lists for prospecting and direct marketing (see Figure 1). You can print labels from within MarketPlace or export data for use in other applications. MarketPlace isn't for everyone, but it's worth considering if you want instant access to a wealth of prospects and full control of your data management.



Figure 2: With Satori's Bulk Mailer Plus, you can merge lists containing up to 90,000 records. Its unique Purge feature searches for duplicates and keeps track of "close calls" that you may want to eliminate.

Mailing-List Management

No matter the source of your address database, everything hinges on its accuracy. You should clean it up regularly, weeding out erroneous and duplicate records, especially after merging it with other lists. You can "merge and purge" in several ways.

The most time-consuming housecleaning method is to go through the entire list manually, looking for incomplete and duplicate records. This isn't too onerous if you have only a few hundred addresses, but for anything bigger, you should find another method.

For example, if you mail newsletters to a large user group or send direct-marketing material to whole towns at a time, you can use a dedicated mail-list manager such as Synex's MacEnvelope Plus or Satori Software's Bulk Mailer Plus to clean up your mailing list. Both can handle large databases (100,000 and 90,000 records, respectively), and each comes with unique purge capabilities. MacEnvelope Plus functions just like its sibling, the envelope-printing utility MacEnvelope (see the "Pushing the Envelope" sidebar) and adds features such as flag and comment fields for each record, the ability to generate bulk-mailing reports, and a sophisticated importing feature that can ignore or add default text to individual incoming fields. As lists are merged, the application automatically compares incoming records to the existing file and if it finds an exact duplicate, it places the duplicate in a separate file that you can check manually. Unfortunately, if two records are the same except for a misspelled name, MacEnvelope Plus won't identify them as duplicates.

Bulk Mailer Plus, on the other hand, can identify and flag "close calls" such as the one just described. As it searches for duplicates, you can ask it to save all close calls for later examination, allowing you to manually delete one, the other, or neither (see Figure 2). It's a great feature that saves a lot of time, and it's much more accurate than simply eyeballing the list.

If you're on a budget and can't afford a dedicated mail-list manager, there are a few painless ways to clean up your list. Perhaps the easiest is to ask recipients to notify you of any mistakes on their mailing label or prominently place the words *Do Not Forward — Address Correction Requested* on all your outgoing mail. Instead of forwarding such pieces to recipients who have moved, the U.S. Postal Service returns them to you with the new addresses noted, if available. You pay 30¢ for each piece that is returned.

The ZIP+4 Advantage

The best way to avoid these charges altogether is to take advantage of the U.S. Postal Service's free — but little-known — ZIP+4 Conversion service. You send your database to the U.S. Postal Service, where it is "sanitized" — the Postal Service corrects any erroneous ZIP codes, misspelled street and city names, and inappropriate abbreviations. Additionally, you can request that the appropriate ZIP+4 code and carrier-route number be added to each record. What you get back is a database that conforms to all official postal regulations (see the "Address for Success" sidebar).

But there's a catch. You must send your address list as an SDF (standard database format) file on an IBM disk (use a 3.5-inch disk to make transferring the data easier). In an SDF file (also called a fixed ASCII file), each field of each record begins in a particular column and is the same fixed length in each record. Few Mac applications can export this type of file. Instead, tab-delimited files are the norm — the contents of fields are separated by tab characters, and records are separated by carriage returns. To get around this, you need to transfer the tab-delimited file to a 3.5-inch IBM disk, using the Apple File Exchange utility provided with each Mac as part of the System software. For this you'll need a SuperDrive, also known as an FDHD drive, which is built into all current Macs but is not found in any Mac Pluses or older SEs. Once you've gotten the database onto an IBM disk, import it into an IBM database application and then save it as an SDF file that the postal service can process. When the postal service returns your disk, just reverse the steps.

If all this seems like too much work, there is an alternative. Semaphore's ZP4 is a $499 CD-ROM disc containing a list of more than 27 million valid U.S. postal addresses along with their related ZIP+4 codes and carrier-route numbers. You can look up individual addresses or process entire databases in batch mode. Essentially this gives you the same setup as the U.S. Postal Service's ZIP+4 Conversion service, but ZP4 is at your disposal around the clock and works on your Mac without requiring any burdensome file translation. Rena Systems plans to release a similar product this year.

Addressing the Mail

Not until you are confident of your database's integrity should you actually send mail, at which point a whole

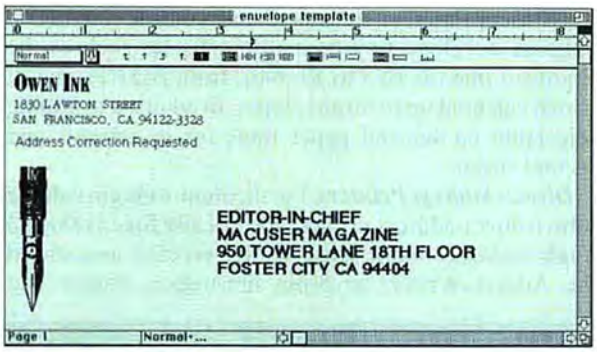


Figure 3: By creating a template with your return address in the upper left corner and the recipient's address block indented several inches to the right, most word processors can serve as a poor man's envelope-printing utility.

host of other problems crop up. Choosing the best option for getting addresses onto each piece of mail depends on what you are sending and how it's generated. Basically, you have several choices, including using window envelopes, printing addresses directly onto envelopes, or printing mailing labels.

Window Envelopes. Perhaps the easiest way to address letters is to use window envelopes. Most word processors let you create a boilerplate into which you can merge addresses from a database or text file. Just make sure the address block appears in the correct place so that it shows through the window when the letter is folded and inserted into the envelope. Incidentally, if you send a lot of mail, consider investing $299 in an ADI Execufold, a small stand-alone device that automatically folds 8.5-x-11-inch sheets in thirds. With the optional $249 Mailmover II feeder, it can process 100 sheets unattended in less than five minutes.

Envelope-Printing Utilities. Envelope-printing utilities are great for light to medium mailers who want to print directly onto their own envelopes, using standard equipment (see the "Pushing the Envelope" sidebar for a comparison of the more popular utilities). If you want to save money, however, these utilities aren't vital. Instead, you can use a word processor to create a template containing your return address (and a logo if you want) in the upper left corner and the recipient's address block-indented several inches to the right (see Figure 3). Using trial and error, adjust the Page Setup and document margins so that everything appears in the right place when printed.

Finally, if your word processor features a glossary, use it to store your frequently used addresses. Rather than retyping your landlord's address when the rent is due each month, for example, you can just retrieve the address from the glossary and print an envelope, using your template. The only disadvantage of this trick is that with a word processor there is no way to print the postal bar codes that can reduce overall delivery time by as much as a couple of days.

Although printing addresses directly onto envelopes provides the cleanest, most-professional-looking results, it's not without its complications. If the printer creases

Table 1: Meeting Your Mailing Needs

	Light Mailer	Medium Mailer	Heavy Mailer
Pieces per month	1 – 100	100 – 1,000	1,000+
Tasks	Personal correspondence, bill paying	Business correspondence, newsletters	Direct marketing, saturation mailing
Address repository	Personal information manager (Pastel Manager, Address Book Plus, Dynodex)	Flat-file database (DAtabase, FileMaker Pro, Microsoft File)	Dedicated mail-list manager (Bulk Mailer Plus, MacEnvelope Plus)
List management	Request address correction from postal service	Use postal service's ZIP+4 Conversion service	ZIP-code database (ZP4 CD-ROM)
Addressing mail	Create a word-processor template for letters to use with window envelopes	Print directly onto envelopes, or print mailing labels	Print directly onto envelopes, or print mailing labels
Software solutions	Word processor, envelope-printing utility (KiwiEnvelopes!)	Envelope-printing utility (MacEnvelope), label-printing utility (StickyBusiness)	Envelope-printing utility (MacEnvelope Plus), label-printing utility (StickyBusiness Plus)
Hardware helpers	One-up label printer (LabelWriter, Smart Label Printer)	Envelope cassette on printer; direct-address printer (AddressWriter)	Multibin feeder (ERGOFEED), continuous-feed envelopes, sheet folder (Execufold), direct-address printer (BOS or Rena Systems)

Regardless of the volume of mail you generate, there's probably a Mac postal product that's just right for you. This chart can help you figure out the best products and techniques for your needs.

your envelopes, try cutting a template from magazine stock and placing it inside the envelope before you print. Obviously this trick is appropriate only if you're not printing lots of envelopes.

Envelope Feeders. Even if your envelopes don't crease, you'll certainly tire of inserting them into the printer after a while. There are several ways around this problem. If you have an ImageWriter or other impact dot-matrix printer, you may want to buy continuous-feed envelopes at any well-stocked stationery or computer store. If you use a laser printer, on the other hand, consider buying an optional envelope tray or multibin feeder such as the Ergofeed line ($1,655 to $3,590), from BDT Products, which can hold up to 50 envelopes, in addition to adding selectable on-demand paper trays for letterheads and second sheets.

Direct-Address Printers. For medium-to-high-volume jobs, a direct-address printer (specifically for envelopes) might make economic sense. CoStar recently announced the AddressWriter, an 8-pin dot-matrix printer that

Pushing the Envelope

Envelope-printing utilities can help you streamline your mailing procedures, but more importantly, most of them let you add postal bar codes to your envelopes too. Until recently, only large mailing houses were able to print postal bar codes on envelopes. Nowadays, however, all you need are a good envelope-printing utility and a laser printer (all the utilities are compatible with dot-matrix printers, but such printers can't generate bar codes). A quick look at several envelope-printing utilities for the Mac reveals some similarities — and a few notable differences.

FastEnvelope

Despite its name, Vertical Solutions' FastEnvelope DA can generate a whole lot more than envelopes. It lets you specify precise template dimensions to print on cards, labels, or any other stock you can feed through your printer.

FastEnvelope lets you position address blocks and graphics anywhere you like. This can be troublesome, because the U.S. Postal Service has strict guidelines governing the placement of elements on an envelope (if your address block falls outside the specified zone, the OCR machines can't read it). Likewise, if anything beside the postal bar code appears in its clear zone, the bars can't be properly interpreted (see the "Address for Success" sidebar).

Addresses entered into FastEnvelope are automatically added to its internal list. Additionally, it has a powerful feature for importing tab-delimited text files for large mailings. Unfortunately, this feature, like several others, is marred by bugs: If you place one field on top of another while formatting, they both disappear. Similarly, the WYSIWYG envelope display doesn't update after inserting the postal bar codes.

These bugs (and other deviations from the Mac human-interface guidelines) diminish FastEnvelope's utility. However, its price is hard to beat — it's now only $10.

KiwiEnvelopes!

If you only print the occasional envelope, Kiwi Software's KiwiEnvelopes! is what you need. Kiwi has settled for simplicity and speed over extra features. Besides, it's pretty quick — the Autopaste option automatically inserts the contents of the Clipboard into the address block whenever you open the KiwiEnvelopes! DA (see Figure B).



Figure B: KiwiEnvelopes!' interface isn't pretty, but it's your best bet if you just want to zap out the occasional envelope with as little hassle as possible.

Of course, simplicity requires some sacrifices. You can't import text files, but you can keep your frequently used addresses in an internal "database." You don't get a WYSIWYG representation of the envelope, nor do addresses appear in the font, size, and style you've chosen, but KiwiEnvelopes! does have a Preview feature.

I can live with these limitations, but there's no excuse for not allowing you to have full font control over the text to be printed on the envelopes — KiwiEnvelopes! offers only bold and italic styles. Furthermore, within any of the text fields, the font, size, and style can't be different. If you want to create a ransom-note-style address block, KiwiEnvelopes! should let you.

MacEnvelope

Synex's MacEnvelope is implemented as both an application and a DA. The application is used to specify the default content and locations of the address blocks, graphics, and messages on the envelope. You can place these anywhere you like, and there is an option that superimposes postal guidelines so you don't place anything in the clear zones. As with KiwiEnvelopes!, you have font control over entire text fields only, not individual characters.



Figure C: Although it looks like a simple envelope-printing utility, MacEnvelope is a mini mail manager capable of handling databases with 1,600 records and printing labels.

When you access the DA, the contents of the Clipboard are automatically pasted into the mailing-address block on the envelope template (see Figure C). You can drag any of the envelope elements to a new position or change the text. The MacEnvelope package includes 17 predefined envelope templates and more than 150 label templates.

MacEnvelope has several powerful features — it can import databases containing up to 1,600 records, sort those records by ZIP code, and then print labels, making it suitable as a mini mail manager. For those who need to handle even more records, Synex sells an enhanced version, MacEnvelope Plus, that tops out at 100,000 records. MacEnvelope's only shortcoming is its lack of full font control. If you can do without font flexibility, MacEnvelope is the way to go for light to medium mailers.

attaches to the Macintosh via the serial port. It holds up to 100 envelopes and prints graphics, text, and postal bar codes over the entire face of an envelope in just 12 seconds. Bundled with a special version of Synex's MacEnvelope, the AddressWriter will cost around $500.

The AddressWriter makes sense for smaller operations, but if you're dealing with really high-volume mailing, investigate a heavy-duty direct-address printer such as the ones offered by Bryce Office Systems and Rena Systems. The Bryce line of addressing machines runs from $3,695 for the BOS 1200 daisywheel printer (1,200 pieces per hour) to $13,900 for the BOS 10K, which can print 10,000 letter-quality envelopes per hour and uses an inkjet mechanism. The 9-pin Rena DA-300, on the other hand, sells for $3,995 (plus $400 for the serial interface) and can output up to 2,500 envelopes per hour in Draft mode. Rena's top-of-the-line DA-307 64-pin printer spews out 10,000 envelopes per hour — and costs a cool $13,495. You can get a special $465 edition of MacEnvelope Plus to work with the Rena printers.

QuickEnvelope

Bundled free with GCC's hard-disk drives and printers, QuickEnvelope is also available as a stand-alone product. It lets you enter return and recipient addresses as well as messages. Unfortunately, it can't print either graphics or postal bar codes.

QuickEnvelope is suitable for heavy mailings. It can hold up to 1,000 records in its internal database and has a Find command so you can retrieve individual addresses. QuickEnvelope also lets you print-merge from a tab-delimited text file. Unfortunately, you cannot import addresses to or export them from the internal database.

Given its inability to print graphics and postal bar codes, as well as its other shortcomings, I can't recommend QuickEnvelope over other similarly priced full-bodied utilities.

The Bottom Line

If you need an envelope-printing utility and you print just a few envelopes at once, KiwiEnvelopes! is a good bet. For heavier mailing, MacEnvelope is the way to go. The first offers simplicity and the second flexibility, and both can print postal bar codes for fast delivery.

Table A: Features of Envelope-Printing Utilities

● = yes ○ = no	FastEnvelope 1.03 $\$\$^{1}/_{2}$	KiwiEnvelopes! 3.1 $\$\$\$$	MacEnvelope 5.0 $\$\$\$^{1}/_{2}$	QuickEnvelope 1.0 $\$\$\$$
Comments	Features and flexibility provide power. Bugs and quirkiness diminish utility.	Simplicity makes one-shot envelopes a specialty. Needs font flexibility.	Mini mail manager does much more than envelopes. Needs font flexibility.	Can't compete without graphics and postal bar codes.
List Price	$10	$49.95	$89.95	$49
Implementation	DA	DA	DA and application	DA
Features				
Envelope size	10 predefined, custom	#10 business, #6 3/4 personal	11 predefined,* custom	#10 business, #6 3/4 personal, custom
Address-list maintenance	unlimited records	unlimited records	1,600 records	1,000 records
Autopaste	○	●	●	○
Full font control	●	○	○	●
WYSIWYG envelope	●	○†	●	○
Graphics	●	●	●	○
Postal bar code	●	●	●	○
Sort	○	○	●	○
Find	●	○	●	●
Import	●	○	●	○
Print merge	●	○	●	●
Export	●	○	●	○
On-line help	○	●	○	●
	Vertical Solutions Box 1150 Beaverton, OR 97075-1150 (800) 222-6032 (503) 671-0790	Kiwi Software, Inc. 6546 Pardall Rd. Santa Barbara, CA 93117-4842 (800) 321-5494 (805) 685-4031	Synex 692 Tenth St. Brooklyn, NY 11215-4502 (800) 447-9639 (718) 499-6293	GCC Technologies 580 Winter St. Waltham, MA 02154-1225 (800) 422-7777 (617) 890-0880

*Plus 150 label templates
†Preview available

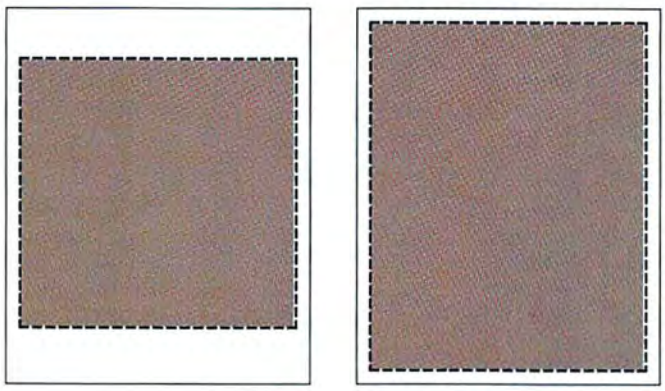
Ironically, the difference bet
and the second best ha



Yes, the ColorPoint offers top-notch color. It also offers superior performance in other respects. But the best news of all is the price—$6,999 for the A (letter) size and $9,999 for the B (tabloid) size.



ColorPoint is PANTONE* certified. So it simulates PANTONE colors and greatly simplifies color proofing.



ColorPoint's unique roll-feed, double-cut technology gives you the biggest image size of any comparable printer. Delivered on perfectly trimmed and finished pages. And this same technology also assures you perfect registration every time.

*Pantone, Inc's check-standard trademark for color reproduction and color reproduction materials. All brand and product names appearing in this ad are registered trademarks or trademarks of their respective holders. Intel is a registered trademark of Intel Corporation. ColorPoint is a trademark of Seiko Instruments USA, Inc. © 1991 Seiko Instruments

ween the best color printer s little to do with color.

ColorPoint is 100% Adobe PostScript language compatible, thanks to the PhoenixPage interpreter. From graphics to fonts, what you get out of the printer is faithful to what you sent it. What's more, PhoenixPage's advanced screening techniques produce smoother shading and less grainy images. ColorPoint also supports industry standard downloadable typefaces such as Adobe Type 1 fonts—including hints.



Obviously, color is critical. It's why you're looking at color printers in the first place. So rest assured, ColorPoint PS offers the best color around.

But before you decide on a color printer purely on the basis of color, you should take a look at ColorPoint's other advantages as well. The speed. The PostScript compatibility. The perfect registration. The ability to print a full page, both in A and B sizes—even in transparency form.

Then take a look at the price.



Five communication ports—parallel, serial, AppleTalk and two SCSI ports—make it easy to connect ColorPoint to Mac, PC, workstation or larger computers. And ColorPoint is easy to share because it will automatically poll the ports, so you don't have to tell it what interface you're using.

We think you'll find that deciding between ColorPoint and second best is a black and white decision.

To find out more, give us a call at 1-800-873-4561 and ask for department SI-51.

ColorPoint includes an Intel* 80960 embedded RISC-based processor that speeds up image-processing time. So you not only get superior 300 dpi quality, you get it as much as 60% faster.



SII
Seiko Instruments

The Bryce and Rena printers operate similarly: The Mac application sends the recipient's address information as straight ASCII text, and the printer interprets the ZIP code to generate the postal bar codes. You can't print graphics, and you can't use Mac fonts.

Mailing Labels. An alternative to all this is to print addresses on mailing labels. For light mailers, a label printer, such as the CoStar LabelWriter or the Seiko Smart Label Printer, is a good choice. The hardware is identical for both of these $249.95 thermal printers, and each can print a single, self-adhesive label in 25 seconds, using the accompanying DA. The LabelWriter also comes with a Chooser driver so you can access the printer from within any application, giving you full font control and the ability to print graphics (Seiko has a similar driver that should be available now). Because of their speed and the cost of labels (roughly 5¢ apiece), these tiny printers are not economical, but they are convenient.

For big jobs, or if you don't want to buy a special label printer, you can use your laser printer to print sheets of self-adhesive labels. (Continuous-feed forms are available for dot-matrix printers.) Simply print a bunch of sheets and have a "peel-and-stick" party with a couple of employees or very close friends. Many database applications come with label templates, and you can choose from several dedicated label-printing utilities. For instance, StickyBusiness ($100) is a labeling program that contains hundreds of stock labels. MacLabelPro ($99.95) is essentially a modified version of StickyBusiness that works only with Avery stock. It comes with 60 existing Avery templates that you can't modify. StickyBusiness Plus ($180), on the other hand, has all the features of StickyBusiness with two important additions: the ability to define a bar code anywhere on a template and an automated postal-formatting feature. It comes with 277 predefined templates, which cover most major label suppliers, and a utility that lets you define new templates as needed.

Any Questions?

If you're using your Mac to create any sort of mail — from personal correspondence to direct-marketing material — there's no excuse for not using it to help mail those pieces as well. If you're not sure how to go about starting to automate your mail, see Table 1. One last piece of advice: If you have any questions about automating your mail, contact your local postmaster or get in touch with a U.S. Postal Service account representative. These people are extremely knowledgeable and anxious to assist you in any way that ultimately makes their jobs easier. By relying on your Mac for greater automation, you're doing your part to hold down the country's postal-processing costs while simultaneously increasing the U.S. Postal Service's efficiency and your own.

San Francisco-based writer Owen W. Linzmayer has successfully automated his mail and feels much better for it.

Directory

Envelope Printers and Accessories

ADI
40671 Highway 41
Suite G
P.O. Box 2910
Oakhurst, CA 93644-2921
(209) 683-2126
Execufold, $299
Mailmover II feeder, $249

BDT Products, Inc.
17152 Armstrong Avenue
Irvine, CA 92714-5718
(800) 346-3238
(714) 660-1386
ERGOFEED 2E, $1,655
ERGOFEED 3E, $2,050
ERGOFEED 5E, $3,590

Bryce Office Systems, Inc.
115 Hurley Road
Building 2C
Oxford, CT 06483-1011
(800) 627-2792
(203) 264-0727
BOS 1200, $3,695
BOS 7600, $5,995
BOS 10K, $13,900

CoStar Corp.
22 Bridge Street
Greenwich, CT 06830-5238
(800) 426-7827
(203) 661-9700
LabelWriter, $249.95
AddressWriter, around $500

Rena Systems, Inc.
290 Hansen Access Road
King of Prussia, PA
19406-2429
(800) 426-7905
(215) 265-8420
DA-300, $3,995
DA-307, $13,495

Seiko Instruments USA, Inc.
PC Products Division
1130 Ringwood Court
San Jose, CA 95131-1795
(800) 888-0817
(408) 922-5900
Smart Label Printer, $249.95

Label-Printing Utilities

Avery Commercial Products Division
818 Oak Park Road
Covina, CA 91724-3624
(818) 915-3851
MacLabelPro, $99.95

Williams & Macias, Inc.
3707 S. Godfrey Blvd.
Spokane, WA 99204-5753
(509) 458-6312
StickyBusiness, $100
StickyBusiness Plus, $180

Mailing-List Managers

Lotus Development Corp.
55 Cambridge Parkway
Cambridge, MA 02142-1295
(617) 577-8500
Lotus MarketPlace: Business, $695
Four quarterly updates, $150
5,000 additional records, $400

Satori Software
2815 Second Avenue
Suite 560
Seattle, WA 98121-1262
(206) 443-0765
Bulk Mailer Plus 3.25, $350

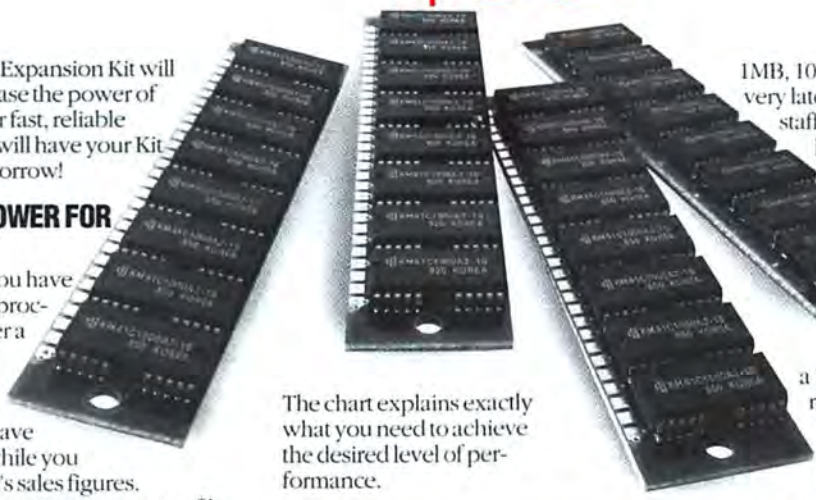
Semaphore Corp.
207 Granada Drive
Aptos, CA 95003-5007
(408) 688-9200
ZP4 CD-ROM, $499

Synex
692 Tenth Street
Brooklyn, NY 11215-4502
(718) 499-6293
MacEnvelope Plus 2.0, $250

United States Postal Service
National Address Information Center
Diskette Processing Services
6060 Primacy Parkway
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Memphis, TN 38188-0001
(901) 683-7661
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WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs - (2 @ $59 ea.).



The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory.	Do this: (Install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1 MB SIMMs. leave two sockets for future expansion.
2-1/2 MB	Remove only two 256K SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256K SIMMs with four 1 MB SIMMs.
To upgrade an 8-socket Mac II, IIx, IIcx, oe SE 30 to this amount of memory.	**Do this: (Install in multiples of four only.)**
4 MB	Remove all four existing 256K SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1 MB in remaining sockets.
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To open your Mac Plus or SE, you'll need a specially designed tool - it's available from us as part of a handy tool kit for just $9.

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Memory chips come factory-installed on plug-in cards, called SIMMS (Single Inline Memory Modules). Each one megabyte SIMMS card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.
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1-4 Users DAC0033 $125.
5-8 Users DAC0034 $189.



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ACC0411 110 SE UPS 219.
ACC0458 200DL UPS 159.
ACC0451 370ci UPS 349.
ACC0453 450AT UPS 349.
ACC0454 520ES UPS 419.

Apple
ACC0336 Toner Cartridge - LaserWriter II 105.

Basic Needs, Inc.
ACC0356 Dust Cover - Mac II & Extended Keyboard (grey nylon) 12.
ACC0348 HardTops ImageWriter II Cover 16.
ACC0347 HardTops Mac Extended Keyboard Cover 15.
ACC0345 HardTops Mac Plus Keyboard Cover 15.
ACC0346 HardTops Mac Standard Keyboard Cover 15.
ACC0466 MacIIcx/ci Monitor Stand 49.
ACC0351 Utility Pac 11.

B.A.S.F. (BASF)
MED0030 Disks - DS/HD 1.44 Meg (box of 10) 22.
MED0041 Disks - Preformatted DS/DD (box of 10) 14.
MED0040 Disks - Preformatted DS/HD (box of 10) 25.
MED0029 Disks - DS/DD (box of 10) 12.

Curtis
ACC0469 Command Center 89.

Ergotron
ACC0344 MacTilt II - 13" Color RGB 75.
ACC0128 MacTilt Plus/512 - Platinum 68.
ACC0009 MacTilt SE, SE/030 - Platinum 68.

I/O Design, Inc.
ACC0028 MacLuggage™ Plus Carrying Case 64.
ACC1070 MacLuggage™ SE Carrying Case 75.
ACC0427 Ultimate SE Carrying Case - Black 69.
ACC0440 Ultimate SE Carrying Case - Navy 69.
Ultimate SE/Plus Neon Carry Cases ea 89.

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ACC0055 Fanny Mac QT 55.
ACC0247 SE Silencer 39.

PowerUser™
BND0013 PowerUser Carrying Case w/Free Cap 69.

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MED0031 Disks - 1.44 Mb High Density (3.5) 24.
MED0003 Disks - DS/DD (box of 10) 13.

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ACC0251 Imagewriter II Carry Case (black) 45.
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Key Tronic's new MacPro Plus keyboard is compatible with all Macintosh computers. The enhanced 105-key layout includes Period/Comma lock capability, an interchangeable Caps Lock and Ctrl keys. Also, the connecting cable you need is offered at no extra charge. The keyboard is backed by a limited lifetime warranty and unlimited toll-free product support. Includes offer for Tempo II, a keyboard macro package from Affinity Microsystems a $149.95 value FREE! **INP0083 $118.**

ACC0252 MacPlus/SE Carrying Case (black) 55.
ACC0250 MacPlus/SE- Ext Keyboard Carrying Case 69.
ACC0482 Premier Leather Case 175.

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BUS0133 For The Record 2.0 31.
BUS0132 WillMaker 4.0 37.

Peachtree
FIN0059 At Once! 285.

Reality Technologies
FIN0068 WealthBuilder (Mac) 145.

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STA0010 StatView SE+Graphics 1.03 179.
STA0022 SuperANOVA (MacII Family) 309.

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BUS0131 Cheshire 1.0 63.

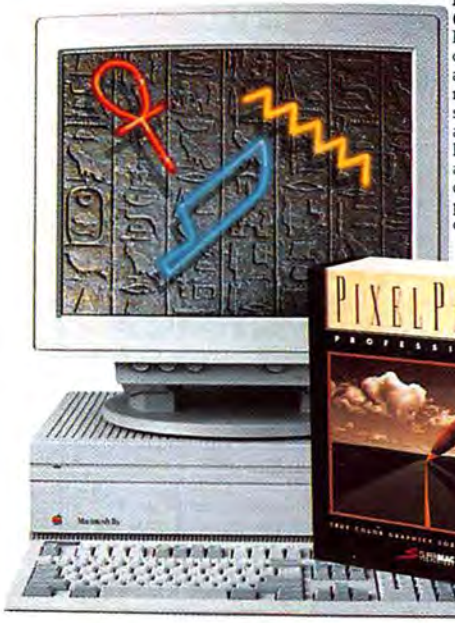
Acius
DAT0045 4th Dimension 2.1 489.

AEC Management Systems
BUS0129 FastTrack Schedule 1.5 139.
DAT0055 AEC Information Manager 409.

Aldus
BUS0066 Persuasion 2.0 329.

ASD Software, Inc.
BUS0134 Planisoft 195.
BUS0146 Planisoft - 5 pack 579.
BUS0147 Planisoft - 10 pack 839.

Ashton-Tate
DAT0042 dBase Mac SPECIAL! 59.

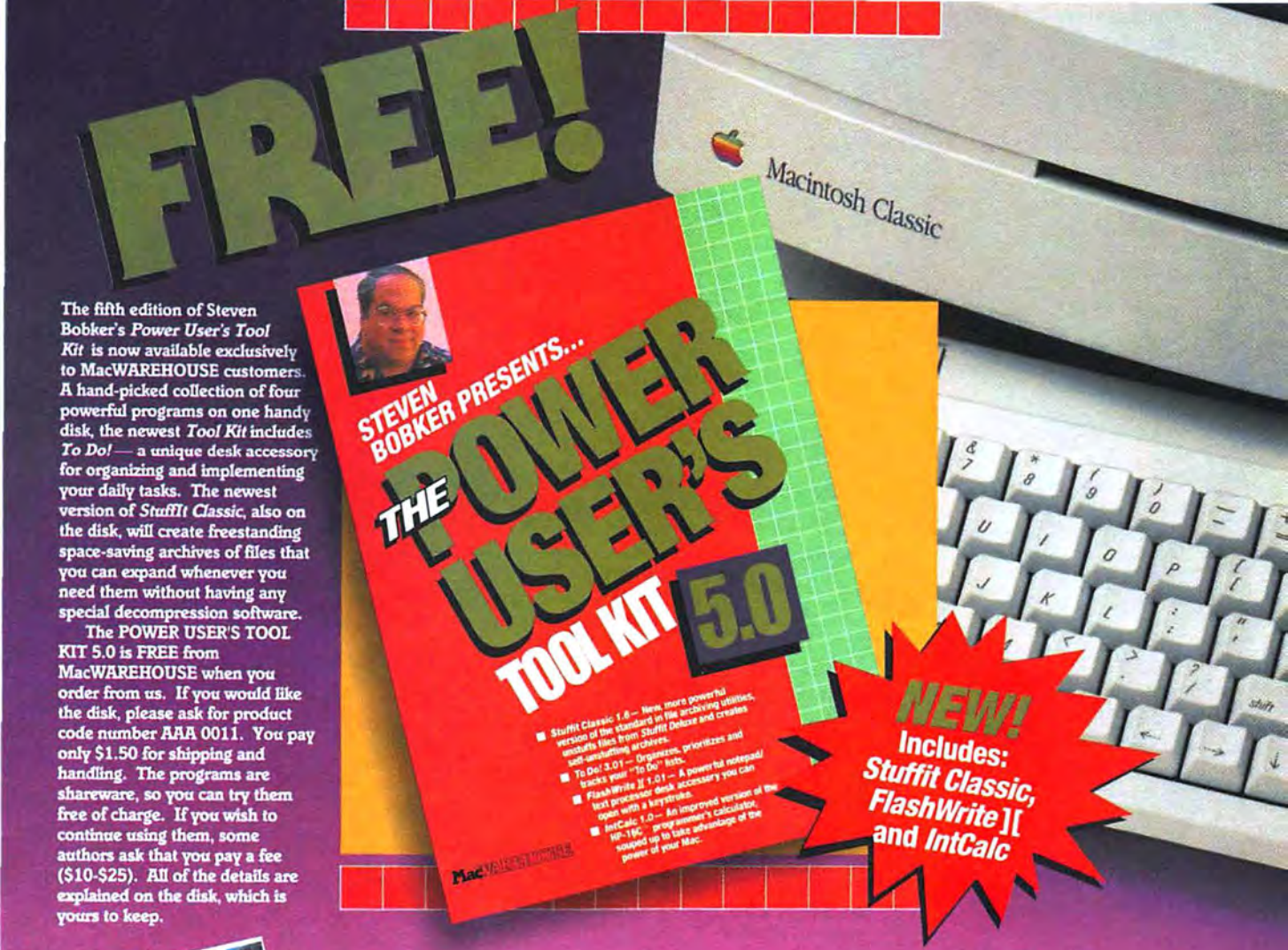


PixelPaint Professional 2.0 (SuperMac)
Now uses virtual memory to open and scroll through large and multiple documents. Its new 8-bit masking tool permits semi-transparent masking from any brush, tool, or image. Wet Paint allows you to reposition and edit any shape or text after original creation. Image processing tools let you adjust color, contrast, and brightness. Many tools are now pressure-sensitive, so they work like real-world tools. PixelPaper lets you create textured canvases that simulate charcoal paper, concrete, linen, and slate. **GRA0249 $465.**



The "ULTIMATE" SE Carrying Case (I/O Design, Inc.)
The "ULTIMATE" SE Carrying Case is designed with the same high quality standards as other MacLuggage products. This case offers internal, padded compartments for ANY Macintosh keyboard, mouse, external hard disk and cables also holds the new Macintosh Classic. It also features 2 additional exterior pockets for everything from disks to umbrellas. Combine these features with sturdy Dupont Cordura nylon and 1/2 inch high density foam padding and you'll see why this is the "Ultimate" carrying case for your Mac. Available in black and navy blue. **$69.**

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PhoneNET® Card for Ethernet (Farallon)
Enables Mac SE/30 or Mac II family computers to utilize the increased speed and band width of Ethernet. You attach the telephone cabling directly to your Mac—no external connector or transceiver is needed. The 10BASE-T compliant PhoneNET Card for Ethernet comes with Timbuktu software, which lets you share screens and transfer files with other Macintoshes running Timbuktu over any AppleTalk network.
NuBus MacII NET0089 $399.
Nu-Bus SE/30 NET0091 $399.
Nu-Bus 10-Pack NET0090 $3449.



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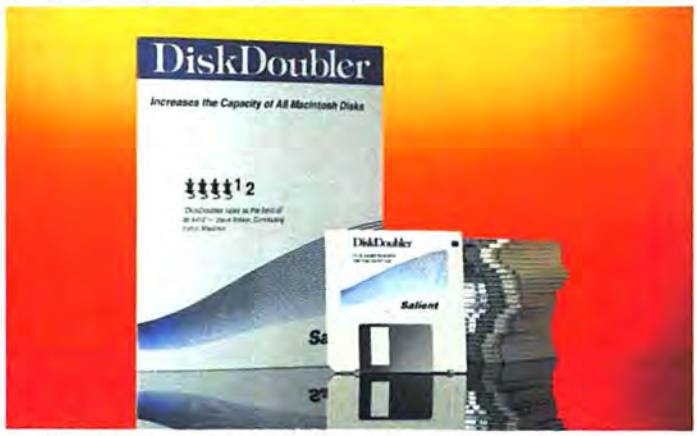
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BUS0135	Alarming Events	65.
GRA0070	CalendarMaker 3.0	31.
Claris		
DAT0064	FileMaker Pro	218.
BUS0058	MacProject II 2.1	365.
BUS0065	SmartForm Designer	289.
DeltaPoint, Inc.		
BUS0099	DeltaGraph 1.5	109.
Fox Software		
DAT0047	FoxBase+/Mac 2.0	292.
Informix		
BUS0064	WingZ 1.1	245.
JAM Software		
DAC0032	Smart Alarms 3.0 (Single User)	64.
DAC0033	Smart Alarms 3.0 (1-4 users)	125.
DAC0034	Smart Alarms 3.0 (5-8 users)	189.
Kaetron		
BUS0100	TopDown 2.0	229.
Mainstay		
GRA0100	MacSchedule 2.5	139.
GRA0237	MacSchedule PLUS	215.
Microsoft		
BUS0003	Excel 2.2	245.
BUS0008	PowerPoint 2.01	245.
BUS0088	The Microsoft Office	529.



Graflex (ICD)
Graflex connects your Mac to any printer with a Centronics-style parallel interface. Graflex emulates the ImageWriter II on most dot matrix printers, using a special cable with the adaptor interface built in. No bulky power supplies to drag around. Great for Mac Portable users, or anyone who travels with a Mac. **INP0095 $82.**

BUS0014	Works 2.0	199.
Portfolio Systems		
BUS0101	Dynodex - The Instant Address Book	75.
DTP0055	DynoPage	57.
Power Up		
BUS0096	Address Book Plus	52.
BUS0073	Calendar Creator	35.
BUS0121	FastForms 2.0	105.
Round Lake Publishing		
BOK0007	LetterWorks	59.
Satori		
BUS0025	Bulk Mailer 3.2.5	75.
Softview (Full line available)		
BUS0138	if X Forms Designer	175.
	if X Expense Reports	ea. 49.
Symantec Corporation		
BUS0055	More 3.0	265.
Symmetry		
BUS0075	KeyPlan	245.
Synex		
BUS0120	MacEnvelope Plus 2.0	159.
Timeslips		
BUS0043	Timeslips III 2.0	195.
T/Maker		
BUS0152	SmartBundle	215.
Vertical Solutions		
BUS0113	FastEnvelope	45.
BUS0105	FastLabel 2.0	45.
Wolfram Research, Inc.		
STA0013	Mathematica (SE)	449.
Zedcor		
BUS0118	DESK 3.03	229.



DiskDoubler 3.0 (Salient Software) Disk Doubler 3.0 compresses your files when you save them and expands them when you open them. It doubles your hard disk and floppy disk storage capacity. Works transparently within any application, and operates in the background under MultiFinder. Disk Doubler works with documents, applications, plus sound graphics, and scanner files. **UTI0179 $45.**

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EDUCORP		
CDR0006	EDUCORP CD-ROM 4.0	159.
CDR0003	EDUCORP Clip Art CD	45.
EDU0198	Lingua-ROM	399.
Wayzata Technology		
EDU0194	The World Fact Book	79.
NEC		
CDR0002	NEC Interface Kit	72.
GRA0212	Photo Gallery	246.
CDR0001	Intersect CDR-35 Reader	399.
Microsoft		
BUS0019	The Microsoft Office CD-ROM	599.

COMMUNICATIONS & NETWORKING

Caravelle Networks Corporation		
NET 0099	Mac to Mac - 5 pack	165.
NET0100	Mac to Mac - 10 pack	229.
NET0101	Mac to Mac - 50 pack	979.
CE Software		
COM0054	In/Out (5 user Pak)	128.
COM0041	QuickMail 2.2 (1 - 10 users)	315.
CompuServe		
COM0040	Navigator 3.0	49.
DataViz		
COM0001	MacLink Plus / PC 4.5	117.
COM0052	MacLink Plus / Translators 4.5	98.
Dayna Communications, Inc.		
UTI0116	DOS Mounter	55.
Farallon™ Computing		
COM0078	Liaison 3.0	259.
NET0005	PhoneNET® 128/512	35.
NET0084	PhoneNET® Manager's Pack	669.
NET0007	PhoneNET® Plus, SE & II	33.
NET0040	PhoneNET® Plus, SE & II - 10 Pack	219.
NET0019	PhoneNET StarController®	825.
NET0059	StarController™ EN (EtherNet)	1629.
NET0058	Timbuktu® 2.0 - Remote Access Pack	845.
NET0038	Timbuktu® 3.1	95.
NET0034	Timbuktu Remote® 2.0 PhoneNET® Card for EtherNet	123.
NET0089	Nubus Mac II	399.
NET0091	SE/30	399.
NET0090	Nubus 10-pack	3449.
FreeSoft		
COM0060	White Knight 11	85.
Hayes		
COM0015	Smartcom II 3.2	84.
Insignia		
UTI0174	AccessPC	65.
COM0063	Soft PC AT/EGA Module	125.
COM0045	SoftPC 1.3	245.
International Business Software		
NET0097	DataClub - 3 Pack	199.
NET0098	DataClub - 10 Pack	539.
Microcom		
NET0041	Carbon Copy Mac - single	117.
NET0088	Carbon Copy Mac - twin	189.
Prodigy		
COM0056	Prodigy Starter Kit for the Mac	27.
Sitka		
NET0056	InBox Plus 3.0	1299.
NET0057	DOSTOPS 3.0	165.
NET0049	MACTOPS 3.0	187.
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COM0043	Microphone II 3.0	215.
Traveling Software		
NET0045	Lap-Link III - Connectivity Pac	99.

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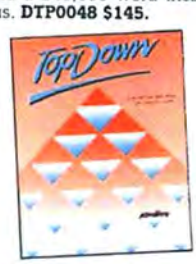
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Letraset
FON0086 LetraStudio 275.
Multi Ad Services
DTP0042 Multi Ad Creator 2.21 695.
Quark, Inc.
DTP0028 QuarkStyle 189.
DTP0049 XPress 3.0 525.
Silicon Beach
DTP0040 Personal Press 205.
TimeWorks
DTP0048 Publish It! Easy 2.0 145.

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INP0148 QuadraLink 215.
Computer Friends
GRA0251 ColorSnap 32 Plus 649.
Cutting Edge
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DRI0157 20 meg Under the Mac Drive 319.
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DRI0162 45 Mb Removable Hard Drive (Syquest) 639.
DRI0159 45+ meg Under the Mac Drive 429.
DRI0160 60+ meg Under the Mac Drive 479.
DRI0161 80+ meg Under the Mac Drive 529.
Dayna Communications, Inc.
DRI0174 DaynaFile dual 360K (5.25) & 1.44 (3.5) 749.
DRI0104 DaynaFile single 360K (5 1/4) 499.
Fujitsu
DRI0186 800K Disk Drive - Fujitsu 99.
Kennect Technology
DRI0218 Drive 1200 259.
DRI0141 Drive 2.4 329.
DRI0219 Drive 360 (5.25 in. floppy disk drive) 259.
DRI0140 Rapport 199.

MaccessCard Reader (ASD)
The MacessCard Reader requires FileGuard 2.5 software. The software can be configured so that without a registered MaccessCard or the combination of a MaccessCard and an access key, no one can gain access to your Mac. Cards packaged with the reader can be used or the system can be trained to recognize any ID card (Visa, company or student ID card). **ACC0539 $319.**



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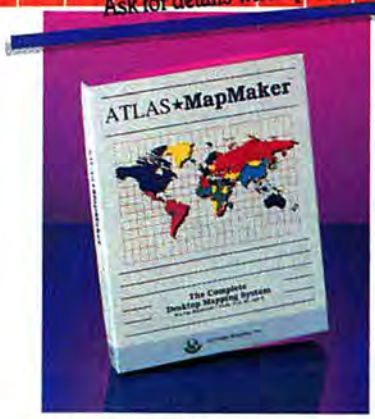
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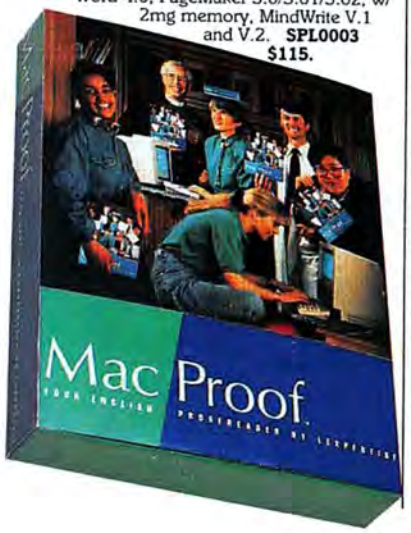
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ENT0347 Wizardry II: Knight of Diamonds 29.
Spectrum HoloByte
FACES, TETRIS, Welltris ea. 25.
The Software Toolworks
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ENT0278 Life & Death 32.
ENT0269 The Hunt For Red October 20.
Three-Sixty
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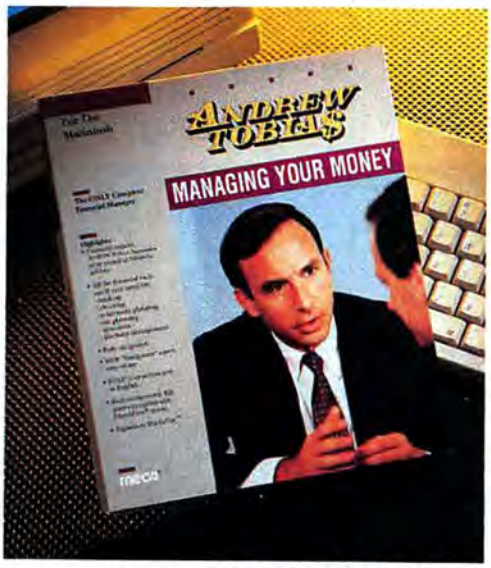
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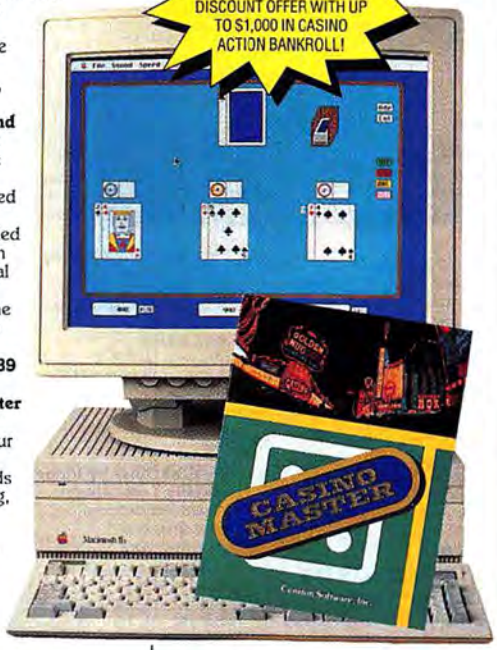
Strategic Mapping, Inc.
GRA0227 Atlas MapMaker 4.5 369.
Studiotronics
GRA0189 Colorset 1.5 229.
SuperMac
GRA0109 PixelPaint 2.0 225.
GRA0249 PixelPaint Professional 2.0 465.
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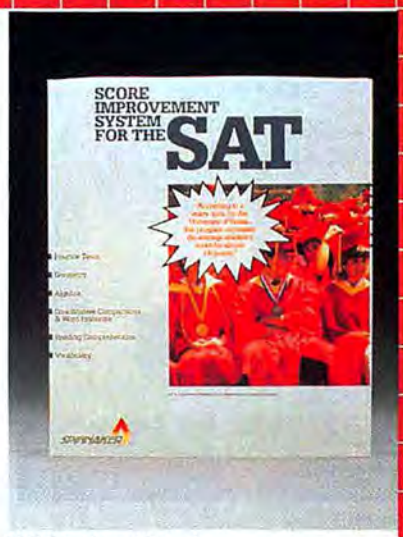
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MegaGraphics
MON0015 8-bit 19" Hi-Res Greyscale for Mac II ... 1879.
MON0016 8-bit 19" Hi-Res Greyscale for SE/030 . 1899.
MON0006 Rival System for Mac II 1269.
MON0008 Rival System for Mac SE 1269.
MON0007 Rival System for Mac SE/30 1269.
Seikosha
INP0041 Seikosha SP 2000 AP Printer 235.
Sharp
COMP007 Wizard OZ 7000 (32KRam) 229.
COMP018 Wizard OZ 7200 (64KRam) 255.
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Datadesk International
INP0097 DataDesk Switchboard 159.
INP0047 Mac 101 Keyboard SE/II 129.
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GRA0145 Computer Eyes B & W 199.
GRA0154 Computer Eyes For Mac-Color 349.
ICD
INP0095 Graflex 82.
Kensington
NP0059 Turbo Mouse 109.
INP0060 Turbo Mouse ADB (SE or II) 109.
Key Tronic
INP0083 Key Tronic Mac Pro Keyboard 118.

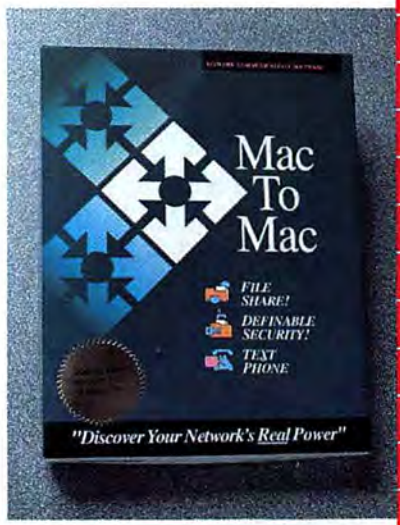


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INP0114 IS/ADB Tablet 12 x 12 385.
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Microspeed
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Mouse Systems
INP0132 Little Mouse ADB 75.
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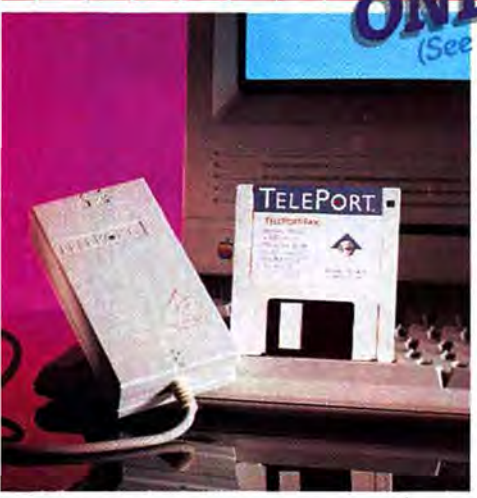
1 MEG SIMMs Low profile, 100ns, High Quality 59.
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BUS0003 $245.



Connectix
UTI0144 Virtual 030 UM3 115.
DRI0185 Virtual 2.0 PMMU 188.
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DRI0198 MaraThon 030 - (Mac SE) w/ Virtual 529.
DRI0197 MaraThon 030 - (MacPlus) w/Virtual 529.
DRI0152 MaraThon 030X (MacIIx) w/ Virtual 529.
DRI0151 MaraThon 030-SE/030 w/ Virtual 529.
Micron Technology
DRI0321 PicturePress Card (Xceed ICDP-II) 745.
MicroTech International, Inc.
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DRI0315 Mac Classic Upgrade Kit 20-1 399.
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DRI0318 Mac Classic Upgrade Kit 40-3 575.
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CHP0013 1 Meg Simm 100ns PowerUser 59.
Total Systems
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DRI0299 Mercury SCSI Module - Plus 189.
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DRI0265 Gemini Plus Kit 129.

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MOD0034 InterFax 24/90 349.
Applied Engineering
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Best Data Products
MOD0021 SmartOne 2400/1200 139.
Dove
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Global Village
MOD0049 TelePort 129.
MOD0058 TelePort/Fax 189.
Hayes
COM0023 Smartmodem 2400 349.
MOD0017 Smartmodem 9600 (V series) 719.
MOD0060 Personal Modem 2400 w/Smartcom II ... 179.
Microcom
MOD0050 MacModem V.32 / 9600 689.

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MOD0043 PowerUser 2400 99.
MOD0047 PowerUser Mini Send Fax 2400/9600 149.
MOD0051 PowerUser Send/Receive Fax Modem 2400/9600 279.
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Shiva
NET0067 NetModem V.32 (9600) 1395.
Supra Corporation
MOD0020 SupraModem 2400 119.

MUSIC & SOUND

Altech Systems
MUS0032 ALTECH MIDI Interface 59.
Coda Music Software
MUS0044 Finale 2.5 549.
Electronic Arts
MUS0004 Deluxe Music Construction 2.5 85.
Farallon™ Computing
MUS0036 MacRecorder® 2.0 159.
Opcode Systems
MIDI Translator 43.
Tactic Software
Sound Clips Vol. 1, 2, 3 & 4 ea. 50.

SECURITY & VIRUS PROTECTION

ASD Software, Inc.
UTI0135 FileGuard 2.5 139.
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Symantec Corporation
UTI0149 Symantec Antivirus for the Mac 2.0 (SAM)67.

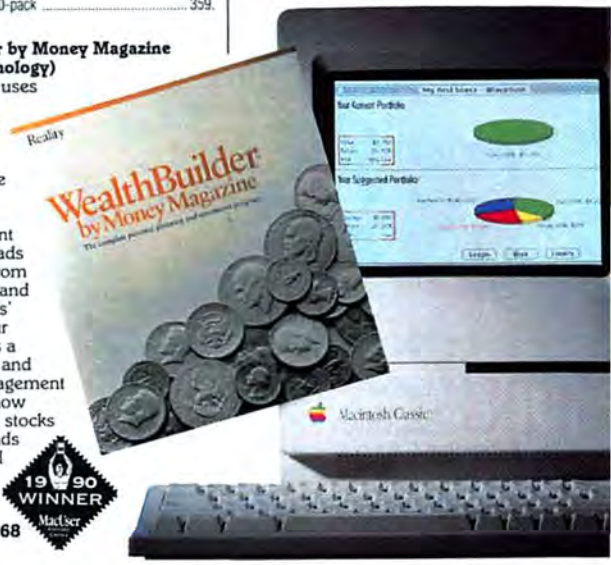
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UTI0185 Freedom of Press Light 3.0 56.
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ICOM Simulations, Inc.
UTI0084 On Cue 35.
Insight Developement
UTI0098 MacPrint 1.2 95.
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Kent Marsh
UTI0028 MacSafe II 107.
UTI0054 NightWatch 1.03 86.
Microcom
UTI0093 Virex 2.9 59.
UTI0150 Virex 10-pack 359.

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LNG0030 QuickBASIC 64.
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UTI0199 Multi Ad Search 125.
Now Software
UTI0167 Now Utilities 2.0 79.
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ON Technology
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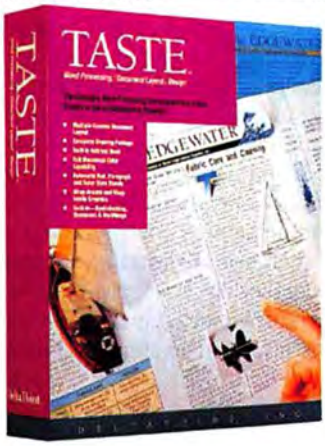
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UTI0190 Personality 53.
UTI0183 ScreenShot 31.
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UTI0179 DiskDoubler 45.
Shana Corporation
LNG0037 Inside Out 369.
SNA
UTI0207 Offline 51.
Symantec Corporation
UTI0151 Norton Utilities for the Mac 89.
UTI0078 Symantec Utilities for Mac II (SUM) 99.
LNG0001 THINK's C 4.0 165.
LNG0002 THINK's Pascal 3.0 165.
The HandOff Corporation
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LNG0031 ZBasic 5.0 99.

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Claris
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DeltaPoint
WRD0032 Taste 85.
Deneba Software
SPL0015 Spelling Coach Pro. 3.1 124.
Lexpertise
SPL0003 MacProof 3.2.1 115.
LifeTree Software
SPL0028 Correct Grammar 59.
Microsoft
WRD0022 Word 4.0 245.
RightSoft
WRD0031 RightWriter 55.
Sensible Software
WRD0023 BookEnds 1.2 51.
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BY OWEN W. LINZMAYER

SIMMple PLEASURES

The cheapest way to add muscle to your Mac is to add more memory. Here's all you need to know to buy and install the right SIMMs for the best price.

Man's thirst for soda and random-access memory is unquenchable. In his book *Odyssey,* John Sculley recalls that given unlimited access to discounted cola, "no matter how much Pepsi [our test families] ordered, they would always consume it." The Pepsi Principle holds for memory as well. The original Mac overflowed with 128K of RAM, but users soon clamored for more. Nowadays, 8 megabytes only whets the appetite of power users.

The waves of the future — System 7.0, voice input, 24-bit color, 3-D graphics, animation, and multimedia — all have one thing in common: a voracious appetite for memory. If you've been hankering for a second helping of memory, here's good news for you. It's never been easier or cheaper to satisfy your craving.

All Macs since the Plus (with the exception of the Classic and the Portable — see the "RAM to Go" sidebar) are easily upgraded by the simple installation of memory modules called SIMMs (single in-line memory modules). A SIMM is a group of RAM chips mounted on a circuit board that snaps into a socket on the motherboard. The number and size of the SIMMs in your Mac determines how much memory is available to applications. Each Mac accepts slightly different memory configurations (see Table 1). The reasons for the memory mishmash are complicated and can be ignored altogether. If your inquiring mind wants to know, read on. Otherwise trust me; skip the "Whys and Wherefores"; and jump to the next section heading, "Capacity."



PHOTOGRAPHY: PAUL HOFFMAN



Whys and Wherefores

The Mac's hardware and software conspire to place limitations on how much memory can be used. The CPU configuration determines whether you need to upgrade in increments of two or four SIMMs at a time, and the ROM and System software determine the maximum amount of memory that applications can access.

The CPU in the Mac Plus, SE, and Classic is the Motorola 68000, which has 24-bit address lines. Apple engineers decided, however, to use only a 16-bit data path to RAM. The same is true with the Mac LC, even though it uses the 32-bit 68020 processor. Because SIMMs have 8-bit data paths for these machines, you must add memory in pairs so that the CPU receives 16 bits of data at a time. All other Macs use 68020 or 68030 processors with 32-bit data paths to RAM. To keep the CPU satisfied, data is fed to it 32 bits at a time; with these machines, you must add SIMMs in groups of four. Each group is called a memory bank.

Currently, the Mac Plus, SE, and Classic all top out at 4 megabytes if you put 1-megabyte SIMMs into their four sockets. The ROMs in these machines prevent you from using 4-megabyte SIMMs. All the other Macs have different maximum amounts of RAM that they can contain (see Table 1), but System 6.x limits all of them to approximately 8 megabytes. When it's running in 32-bit mode, System 7.0 is supposed to remove this barrier for some machines.

Unless you have "32-bit clean" ROMs, you'll be stuck with running System 7.0 in 24-bit mode with its 8-megabyte limit. The only practical use for 4-megabyte SIMMs in your Mac today is to create a RAM disk with either Connectix's Maxima or Technology Works' NanoDISK (see reviews, September '90, page 92). Both let you use RAM in excess of 8 megabytes as a RAM disk, and Maxima also tricks the System software into allowing applications to access up to 14 megabytes under either System 6.x or 7.0. Both programs require a PMMU (paged memory-management unit) 68851 chip (it's built in to the 68030 and is an option on the Mac IIsi).

Connectix's recently announced Optima software allows 32-bit-clean software — such as Photoshop and ColorStudio — to access up to 4 gigabytes of memory under System 6.x (although not with MultiFinder). The 512-megabyte SIMMs required for the maximum configuration aren't available. Not yet, anyway. The biggest SIMMs currently on the market are Newer Technology's composite 16-megabyte modules, which cost $1,950 each. Newer Technology sells eight modules bundled with Optima, giving applications access to 128 megabytes as system memory under the Finder.

Capacity

Sometimes a memory module's size is expressed as a particular capacity followed by the letter *X* and a number, such as 1 MB x 8. That means that the module is composed of eight 1-mega*bit* chips, for a total of 1 mega*byte*, because there are eight bits to the byte. Technicians may find this fascinating cocktail-party conversation, but all you need to know is the capacity of the module. Who cares how many chips make up a 1-megabyte SIMM — after all, a megabyte is a megabyte to the Mac, right?

The one wrinkle worth noting concerns more-expensive modules containing a ninth parity chip for error correction. These SIMMs are common in the IBM market, but Apple gave optional parity-checking capabilities to the Mac IIci only to satisfy a buying criterion for some government contracts. Provided they're fast enough, parity SIMMs can be used in all Macs without harm, but only the Mac IIci is available in a special model that implements error correction. Because parity SIMMs are more expensive, you might as well buy normal 8-chip SIMMs instead.

Back in the Mac Plus' heyday, 256K SIMMs were the standard. Nowadays, 1-megabyte modules are the most common, with 4-megabyte SIMMs coming on strong. And with the introduction of the Mac IIsi, 2-megabyte SIMMs have appeared. Right now these SIMMs cost dearly, and economies of scale are unlikely to make them more affordable, because they work only with the IIsi. If you're thinking about buying memory today, stick with either 1- or 4-megabyte SIMMs, unless you've got deep pockets and a need for 16-megabyte monsters.

Unless you donate them to a school for a tax write-off, used 256K SIMMs are virtually worthless — maybe an arts-and-crafty friend can fashion them into bolo ties or earrings. The only other recycling option to consider is a "banana board," such as the Softstep series from Computer Care. Plug four 256K SIMMs into one of these carrier boards, and use it in a Mac as you would a 1-megabyte SIMM, or combine four 1-megabyte SIMMs into a composite 4-megabyte board. Keep in mind that these boards are much larger than normal; draw more power; and have a greater chance of failure, because of all the extra contacts.

SIMM Sizes

If you've been reading the fine print in memory advertisements, you may have seen the term *low profile* referring to SIMMs. This doesn't mean that the boards are in the Federal Witness Protection Program but rather that they're physically small. This is in contrast to the high-profile SIMMs that were more common a few years ago. It basically comes down to the type of chip used on the board. A low-profile SIMM has small surface-mounted chips typically mounted directly to the front surface of the board, whereas a high-profile SIMM has larger DIP (dual in-line package) chips with leads soldered into holes in the board. However, some composite SIMMs that use surface-mount technology — such as the 16-megabyte ones from Newer Technology — may have high profiles. So what?

RAM to Go

The Mac Portable doesn't use SIMMs at all. It has 1 megabyte of SRAM (static random-access memory) on the motherboard, and there are two connectors into which memory-expansion devices can be added. One is an expansion slot designed specifically for memory cards, and the other is the PDS (Processor Direct Slot) for a variety of peripherals, including memory cards and internal fax modems. When buying memory cards for the Portable, be sure to ask which slot they go into and whether they block future expansion.

Because the Portable uses static memory, it can retain its data without constant refreshing, so when you put the Portable to sleep, it doesn't need a lot of power to keep its memory contents intact. The drawback is that SRAM is very expensive.

Some third-party cards keep costs down by using pseudostatic and dynamic memory instead, both of which need periodic refreshing. Pseudostatic chips have refreshing capabilities built in, whereas DRAM chips require external circuitry that's usually provided on the memory board. Dynamic memory requires the least power in active and standby modes, but static memory consumes the least power in Shut Down mode. Keep in mind that all types of memory consume power whether they're used or not, so don't buy too much memory or you'll drain your battery needlessly.

All Macintoshes can accept both high- and low-profile SIMMs, but all other things being equal, you should buy only low-profile boards. In a Mac SE, high-profile boards might block future expansion plans by interfering with add-in boards. In Macs without fans, high-profile SIMMs block airflow around the motherboard. Finally, in a Mac II or IIx, high-profile SIMMs might prevent you from adding a full-height hard-disk drive. Surface-mounted chips are more reliable in the long run. All this information is well and good but hardly practical: The simple fact is that none of the major memory vendors still sells high-profile SIMMs in the most common 1- and 4-megabyte capacities.

Speed

Although the capacity and size of the SIMMs that go into your Mac may vary, there's one area in which there's no leeway: speed. The speed at which data can be retrieved from a SIMM is measured in nanoseconds (nsec or ns), or billionths of a second. The lower the nanosecond rating, the faster the SIMM. Most SIMMs have their speed printed right on the chips. Look for the part number, and then multiply the last one or two digits by 10 to determine the speed rating. For example, if the number ends in dash 12, it's a 120-nanosecond module.

The speed you need depends on your Mac, from 150-nanosecond SIMMs for the Plus to 80-nanosecond modules for the IIfx. Although it doesn't hurt to use memory that's faster than required, it doesn't help either. If you put 80-nanosecond SIMMs into a Mac Plus, it's still going to plod along as it normally does, because the speed of the Mac is determined by its processor, not the memory. But if you plan to upgrade to a faster Mac, you'll be able to take the memory with you. You'd be hard-pressed to find a vendor currently selling anything slower than 80 nanoseconds, so the whole issue of SIMM speed is moot. By the way, feel free to mix speed and brands of SIMMs as long as the minimum speed requirements of the Macintosh are met and you don't mix speeds within a memory bank.

Price

The first rule when buying memory is to ignore published prices. Because SIMMs are virtually a commodity item, their prices fluctuate daily like the Dow Jones industrial average. Monthly magazines such as *MacUser* have a three-month lead time, so the prices in the ads are likely to be severely out of date. Call several companies, and ask for their current prices. Don't hesitate to ask a company if it will match a competitor's price — many will.

During a recent telephone poll of a dozen mail-order firms, the most expensive vendor was charging 60 percent more than the cheapest one, but generally the prices per SIMM don't vary by more than a few dollars. At press time, 1-megabyte SIMMs cost an average of $45 each, with 4-megabyte SIMMs running around $230. As you can see, 4-megabyte SIMMs carry about a 28-percent premium over the cost of four 1-megabyte modules. Expect this premium to disappear as demand for the larger chips increases and production facilities realize greater economies of scale.

The Company You Keep

How can some companies get away with charging more money for essentially the same modules? It's usually a matter of support. Although the chips might not differ, the same can't be said of the service each company provides.

Because SIMMs either work right away or not at all, after-sale technical support isn't much of a consideration. It's important, however, that you speak to a knowledgeable salesperson when placing your order. At the very least, a salesperson should ask what type of computer you own and the kinds of applications you run, which helps determine the appropriate size and speed of the SIMMs you need. If a salesperson is willing to sell you 4-megabyte SIMMs for a Mac Plus, or 150-nanosecond SIMMs for a Mac IIfx, you're talking to the wrong company. (Incidentally, the Mac IIfx uses special 64-pin SIMMs that are compatible with the LaserWriter IINTX, but these SIMMs don't work in other Macs. The extra pins provide separate input and output lines to reduce data bottlenecks.)

Most vendors offer some sort of money-back guarantee, stating that if you aren't happy with the product, you can return it for a refund within a specified time period,

which is usually no more than 30 days. Some vendors may also warrant the products' performance. Lifetime warranties sound good, but they're worthless unless the company is going to be around to honor the warranty when the product fails. When you're calling around, ask each company how long it's been in business so you can get an idea about the firm's stability and commitment to the Mac.

Just as warranties may vary, so do replacement policies. Ideally the firm should pay shipping costs both ways if you must return defective SIMMs. And it should send you new — not repaired — parts, without waiting for receipt of your returned package. A potential "gotcha" to ask about is restocking fees on returned parts. As with all the other service policies, get it in writing.

Physical Fitness

When shopping around, ask how many layers are in the printed circuit board of each module. More layers typically mean less noise. I'm not talking noise in the same sense as a New Kids on the Block concert but rather electronic noise that can cause sporadic problems in your Mac.

When you receive the SIMMs, inspect each module (holding it by the edges as you would a photograph) to make sure that it's free of all contamination and physical defects including oil, dirt, grease, or board speckling (white dots, delamination, damaged edges or surfaces, exposed copper, bubbles, wrinkling, or scratches).

If you find anything visibly wrong with a module, you should request an immediate exchange. Flaky memory manifests itself in fatal system errors, data corruption, and inexplicable results. After you've installed the memory, turn on your Mac and run RAM Check, a public-domain utility from ProVue Development (available on Zmac and other on-line services).

Installation

SIMMs are simple to install, once you've gained access to the sockets on the motherboard. With the Mac II family, that's a snap. Just pop off the top cover, and remove a few Phillips-head screws. With the "classic" one-piece Macs, this isn't so easy. You need a special Torx T-15 screwdriver, which is often supplied by the memory vendors at little or no cost. Once the Mac is open, you must be wary of static electricity as well as the high-voltage lines near the back of the monitor. This isn't as dangerous as it sounds, but if you're at all wary, have a local dealer install the memory (any fee under $50 is reasonable).

If you decide to do it yourself, make sure you have a detailed installation guide to follow. There are all sorts of Byzantine rules about which banks the modules must go into, depending on their size and the type of Mac. Also, in earlier Macs (including the Mac Plus and SE), you must move a jumper or cut a resistor on the motherboard to specify the amount of memory available (see "The Persistence of Memory," February '89, page 140). All late-model Macs automatically figure out how much memory is present — they are truly plug-and-play when it comes to upgrades.

The Bottom Line

It's never been easier or cheaper to add more memory to your Mac — if you follow a few simple rules. Don't buy anything smaller than 1-megabyte modules, and remember to insist on low-profile, 80-nanosecond or faster SIMMs. Shop around for a company that offers a reasonable price, knowledgeable support staff, and generous service policies.

Owen W. Linzmayer is a San Francisco-based free-lance writer who plans to forget everything he learned about memory while preparing this article.

Table 1: The Right Memory for Your Mac

● = yes ○ = no	Speed (nsec)	Permanent memory	Maximum possible RAM	Sockets	256K SIMMs	1-MB SIMMs	2-MB SIMMs	4-MB SIMMs	16-MB SIMMs
Mac Plus	150	none	4 MB	4	●	●	○	○	○
Mac SE	150	none	4 MB	4	●	●	○	○	○
Mac Classic	150	1 MB	4 MB	1*	●	●	○	○	○
Mac SE/30	120	none	8 MB	8	●	●	○	●	○
Mac LC	120	2 MB	10 MB	2	○	●	○	●	●
Mac II	120	none	8 MB	8	●	●	○	●†	●
Mac IIx	120	none	8 MB	8	●	●	○	●	●
Mac IIcx	120	none	8 MB	8	●	●	○	●	●
Mac IIsi	100	1 MB	17 MB	4	●	●	●	●	●
Mac IIci	80	none	32 MB	8	●	●	○	●	●
Mac IIfx	80	none	128 MB	8	●	●	○	●	●
Mac Portable	100	1 MB	9 MB	2	NA	NA	NA	NA	NA

*Optional card adds three sockets.

†Requires ROM upgrade.



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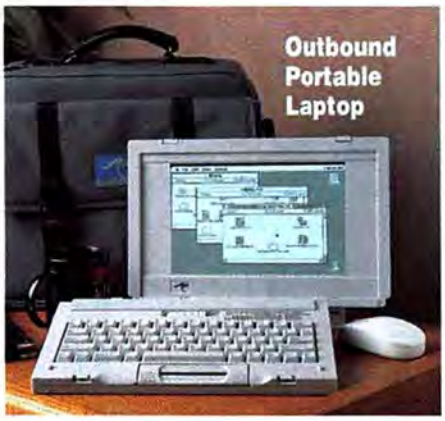
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Hold on to your checkbook — Barneyscan has slashed the price of its CIS•3515 color slide scanner in half! The list price is now $4,495 (reduced from $9,495), making it thousands of dollars cheaper than its Nikon and Howtek competitors. The CIS•3515 offers excellent quality (see "An Inside Look at Scanners," September '90, page 132), and it comes with scanning and image-retouching software. Barneyscan's impressive color-separation package (formerly bundled with the scanner) costs $1,995.

By Aileen Abernathy



Truer colors: The debate over competing strategies for color calibration is rapidly filling the void left by the treaty signings of the Font Wars. The major players — Adobe, EFI, Kodak, SuperMac, and Tektronix — agree that a device-independent, system-level solution is needed to ensure reliable, repeatable colors among scanners, monitors, and printers. ¶ Unlike its competitors, Electronics for Imaging believes that *everyone* — not just high-end users — will want WYSIWYG color and that the solution should be inexpensive, universally available, and completely transparent to the user. EFI's Color Portability technology is being developed under exclusive license from patent-owner MIT. (This exclusivity has been the subject of legal wranglings with Adobe.) ¶ EFI's first commercial products should appear this year. First up: the Firey Controller, a high-performance RIP for the Canon Color Laser Copier that will enhance the CLC's potential as a short-run press and digital proofer. In addition to speed and PostScript compatibility, the Firey offers true continuous-tone color rather than the halftoning that's produced by Canon's controller. EFI also has announced a liaison with Kodak, a major coup that should greatly enhance the viability of Color Portability.



Positive pressure: The latest trend in electronic art is pressure-sensitive tools that can simulate the characteristics of brushes, chalk, and other traditional media. Programs on the bandwagon include Photoshop, Oasis, Studio/32, Digital Darkroom 2.0, PixelPaint Professional 2.0, ColorStudio 1.1, and UltraPaint. ¶ Wacom's pressure-sensitive digitizing styli and tablets started the movement; now Numonics offers the ZedPEN Plus, a $1,510 tablet and stylus with 512 levels of pressure and adjustable sensitivity. Although the tablet comes in only one size (12 x 17 inches), it is the first digitizing system that lets you use a cursor and stylus simultaneously. For example, you can paint with the stylus and enter commands with the cursor.

Product news: Letraset is shipping DesignStudio 2.0. Besides bug fixes, the major addition is the Separator annex, which supposedly color-separates *all* graphics files, including PICT2. ¶ Despite its recent acquisition by Micrografx, Astral Development is finally shipping the Mac edition of Picture Publisher, an image-retouching program that comes in gray-scale and color versions ($595 and $695 respectively). Its claims to fame are cross-platform capabilities (it's a PC port) and calibration features for both scanning and printing. ¶ MicroMaps' latest collection, MapArt, offers excellent maps of every region of the world. It costs $79 in paint format; $179 for EPS or PICT files. Additional MapPack collections focus on topics such as U.S. counties and area codes.

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Didi
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Estro
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Futura (FTN) $300
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Futura Light Oblique
Futura Book
Futura Book Oblique
Futura Medium
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Separating UCR and GCR

Do your eyes glaze over when your printer starts talking about UCR, GCR, and dot gain? Here's an overview of these esoteric — but essential — color-separation techniques.

By Keith Baumann

The new generation of color-separation software gives you unprecedented control over much of the production process, but you also face the challenge of having to master many unfamiliar procedures. If you use programs such as Photoshop, ColorStudio, DesignStudio, Aldus PrePrint, SpectrePrint Pro, or PosterWorks, you may have stumbled across the terms *UCR, GCR,* and *dot gain* in the manuals and dialog boxes without really understanding their significance. Simply put, these are techniques for adjusting the color density on the plates to compensate for differences in inks, papers, and printing presses.

Fortunately, most applications can handle these adjustments for you automatically. But even if you don't want to tweak the controls yourself, knowing a little bit about UCR (undercolor removal), GCR (gray-component replacement), and dot gain can alleviate some of your color-separation anxieties. Although this isn't a complete tutorial — fine-tuning color separations is a complex process that has many variables and requires significant expertise — this overview should help you talk more intelligently to your printer or prepress house.

Introductory Course

First, let's briefly review the basics of four-color separations and the printing process. All pages containing continuous-tone color art such as photographs are printed with the *four-color process*. The colors on each page are separated into four plates, one each for the printing inks: cyan, magenta, yellow, and black (CMYK). When a page goes through the

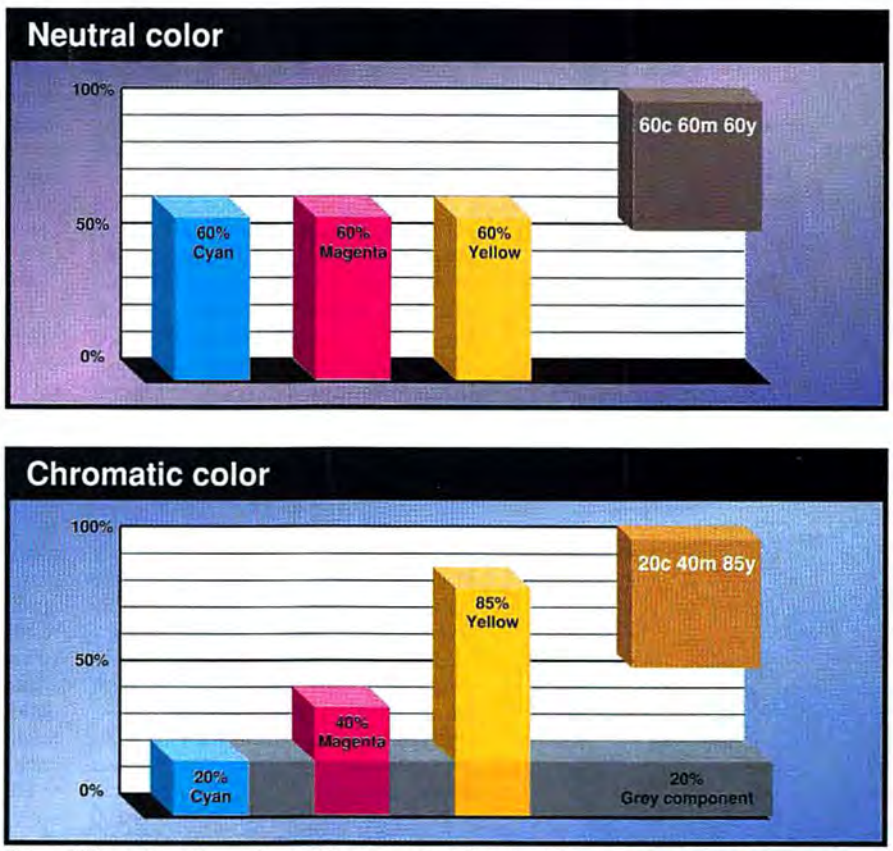
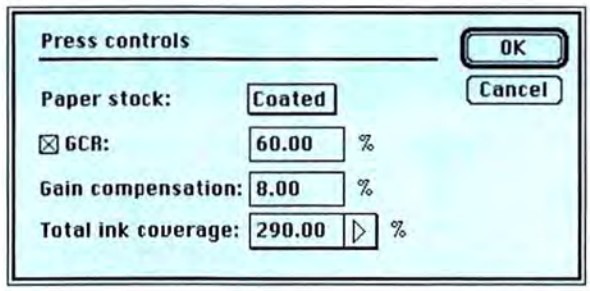


Figure 1: The color at the top is considered a neutral, because it is composed of equal amounts of cyan, magenta, and yellow and should appear as a gray. This color would be affected by both UCR (undercolor removal) and GCR (gray-component replacement). The color at the bottom is not a neutral, because it is composed of different amounts of cyan, magenta, and yellow, but it does contain a 20-percent neutral component. This color would be affected by GCR but not by UCR.



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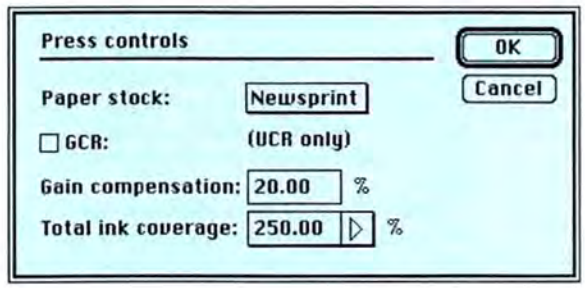


Figure 2: Aldus PrePrint automatically calculates values for UCR, GCR, dot gain, and ink coverage, based on your paper choice. If you don't like the defaults, you can enter your own. Notice the difference in values between coated stock and newsprint, which have vastly different porosities.

printing press, these inks are printed one on top of the other, each using a different pattern of halftone dots. The combined dot patterns create the illusion of a full-color image (to see how this works, look at any color image from a newspaper or magazine under a magnifying glass).

Theoretically, only cyan, magenta, and yellow inks are needed to create the entire range of printable colors. Equal amounts of these three inks should produce grays (the shade depends on the density of the CMY inks), also called the *neutrals*, and 100 percent of each should give you black. In reality, however, ink pigments are never completely pure, so the neutrals actually appear as muddy browns and there is no true black. An image printed with CMY inks only appears flat, lacking sharpness and contrast. To overcome this problem, a black plate is added to the separation. The black ink provides solid blacks, boosts the contrast, and drastically improves shadow details.

Unfortunately, combining all four inks can cause excessive ink buildup. Too much ink can literally gum up the works — clogging the press, causing trapping problems, slowing the drying process, and degrading image quality. The maximum value for ink density is 400 percent, or 100 percent each for all four inks, but the maximum ink coverage that most presses can handle is around 300 percent — that is, the combined values for cyan, magenta, yellow, and black cannot total more than 300 percent. Several programs, including Photoshop, use this as the default value when computing CMYK values for color separations. But the upper limit can vary, depending on factors such as the type of press and paper stock (for example, coated paper can accommodate more ink than newsprint can), so be sure to ask your printer what density value to use for your publication.

UCR versus GCR

UCR and GCR are techniques for reducing the total ink density of a color separation. Basically, both UCR and GCR substitute black for percentages of cyan, magenta, and yellow in image areas where all three colors occur. The difference lies in what portions of the image are affected.

UCR swaps black for cyan, magenta, and yellow only in areas that are completely neutral — that is, colors that contain equal components of C, M, and Y and appear gray or black (see Figure 1). As a result, color swapping occurs only in certain portions of the image, usually the shadow areas. In addition to reducing ink buildup, UCR can bring out details that might otherwise be lost in these darker areas.

GCR, on the other hand, affects *any* color that contains a neutral component. These colors — browns and flesh tones, for example — may not appear gray, but they contain at least a small percentage of all three primaries. The neutral component is equal to the smallest of the CMY percentages. For example, Figure 1 shows

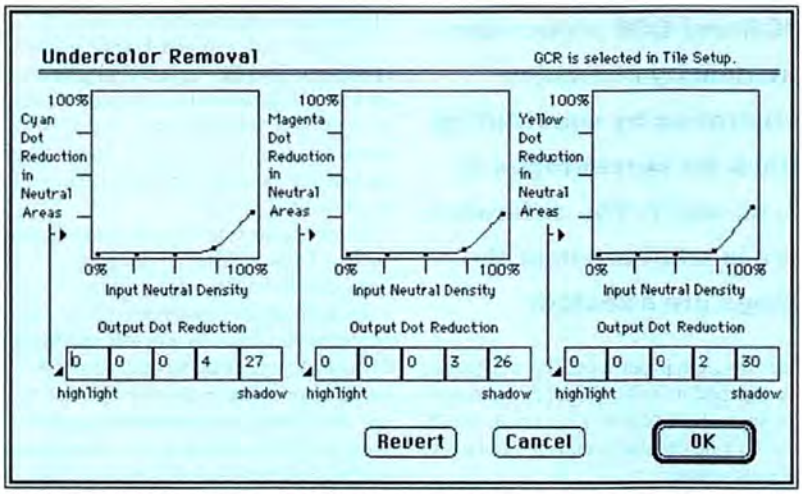


Figure 3: For true power users, PosterWorks offers complete control over all aspects of UCR and GCR. In this example, UCR is applied only in deep-shadow and black areas, and the amount of CMY reduction steadily increases as gray turns into black. Note that this dialog box only removes CMY; a separate Black Generation dialog box specifies how much black to add back in.

a color with a value of 20C 40M 85Y; this color has a 20-percent "gray zone." Applying GCR reduces the ink density throughout an entire image, not just in neutral areas, and often makes colors look richer. A GCR setting of 60 percent removes 60 percent of the neutral portion of each of the chromatic colors and replaces it with an equivalent amount of black. This is not a one-for-one substitution, because less black ink is needed to achieve the same color values.

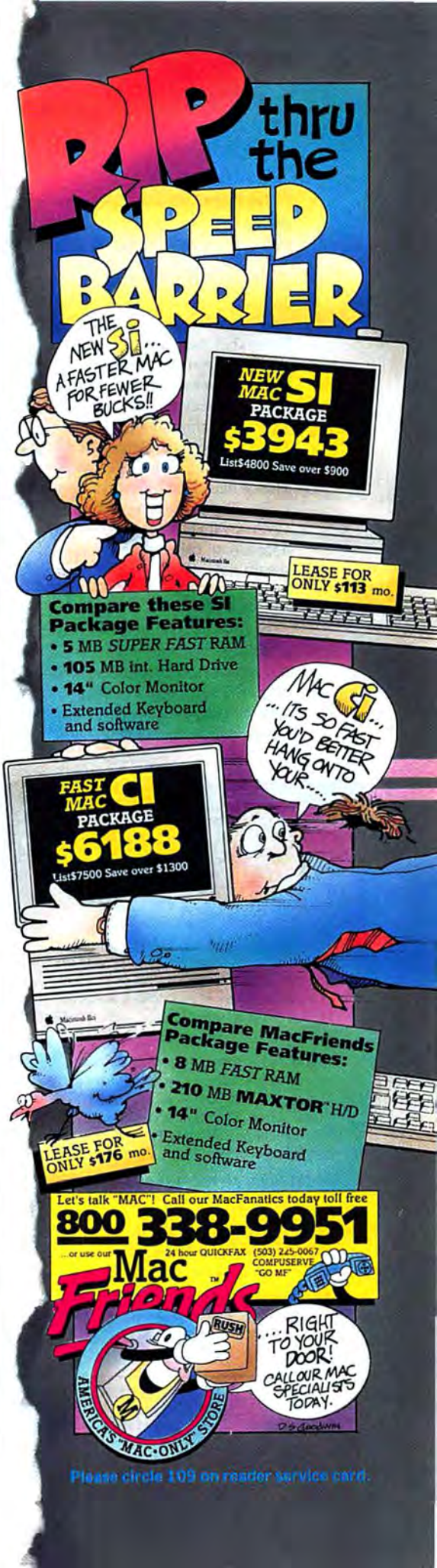
Although UCR and GCR are similar in process, they can produce very different results and it takes experience to decide which will work better on a given image — or even if you need to apply them at all. (Note that you perform either UCR or GCR on a separation, but never both.) The necessity and amount of UCR/GCR varies with the image and the type of printing press, ink, and paper. Always talk to your printers first, because they are experts in these areas and usually know the correct values for your particular job.

User Control

Because of the complexities involved, some color-separation applications don't offer you any choices. They apply UCR or GCR to their separations automatically, using internal tables to determine the correct values. SpectreSeps PM — a color-separation utility for PageMaker documents that's available from Pre-Press Technologies — determines UCR and GCR percentages based on your paper and printing-press choices. Of course, this approach locks you into the values the software developers have chosen (which are usually adequate for most jobs).

Other applications, such as Aldus PrePrint, provide default settings for UCR and GCR but let you turn them on or off or enter your own values (see Figure 2). Letraset's new DesignStudio Separator offers three levels of UCR and six options for GCR. Adobe's Photoshop doesn't let you set UCR/GCR values directly; instead, you select one of five values for "black generation" — the amount of black to generate on the black plate — and the program computes the amount of CMY to remove. The choices range from Light to Maximum, and a Custom option lets you adjust the black density in specific areas of an image.

A few programs offer more-sophisticated controls for UCR and GCR, allowing you to customize the values. Pre-Press Technologies' high-end color-separation program, SpectrePrint Pro, provides interactive controls that let you precisely adjust UCR and GCR. The maximum in user control is the setup offered by PosterWorks. This offbeat poster-making program (from S.H. Pierce & Co.) is actually a color-separation package in disguise. It has separate dialog boxes for UCR and GCR, each of which contains adjustable curves for cyan, magenta, and yellow (see Figure 3). The amount of black generation is also completely user-controllable through another dialog box.



No matter what color-separation program you use, GCR and UCR are actually applied to the separations when the RGB values (the colors you see on-screen) are converted into their CMYK equivalents. In calculating the CMYK values, the program considers not only the UCR/GCR figures but also the settings for paper stock, dot gain, and maximum ink coverage. Thus, the amount of cyan, magenta, yellow, and black placed on each plate can vary, depending on the options selected. For example, if the same photograph is to be printed in both a newspaper and a glossy magazine, it should be separated twice. The separations will have different CMYK values — each optimized for the appropriate paper stock — even though the original RGB colors are identical.

Dot Gain

A final consideration in determining CMYK percentages is dot gain — that is, how much each dot of ink spreads before it dries. The final size of the printed halftone dots depends on numerous factors, which include temperature, humidity, ink viscosity, and paper type. But in general, the printed dots will be larger than those on the separation plates. Left uncorrected, this dot gain can darken images and oversaturate colors.

UCR and GCR reduce the ink density of a color separation by substituting black for percentages of C, M, and Y. The difference lies in what areas of the image are affected.

To compensate for dot gain, the CMYK values in the separation should be reduced slightly. Some color-separation packages allow you to select a specific percentage for dot gain, which is used to calculate the reduction in CMYK values. Other programs simplify the process by having you choose only the paper type (such as coated or uncoated) and then automatically applying preset compensation curves.

Dot-gain compensation is a fairly simple concept to grasp, but as a technique it can be extremely difficult to master. Again, your printers should be able to supply the correct figure, because they know from experience how the ink and paper will react on their presses.

Understanding basic prepress concepts such as UCR, GCR, and dot gain should help you work with color-separation software, but it takes experience to gain insight into how and when to properly use them. These techniques offer several advantages: better color balance, sharper contrast and enhanced details, improved trapping, fewer press problems, better color consistency over a press run, and reduced ink costs.

Unfortunately, unwise use can lead to disaster. Many applications simplify the process by building in default values that provide satisfactory output under average conditions. However, only a skilled technician can consistently produce high-quality color output. To prevent costly mistakes, always check with your printer before experimenting.

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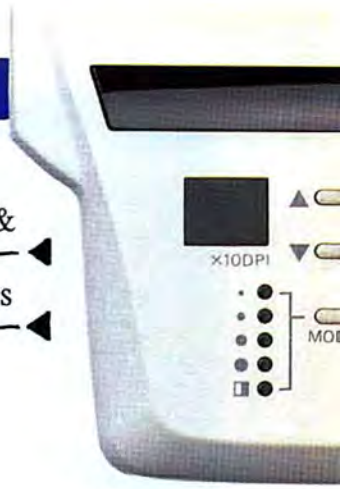
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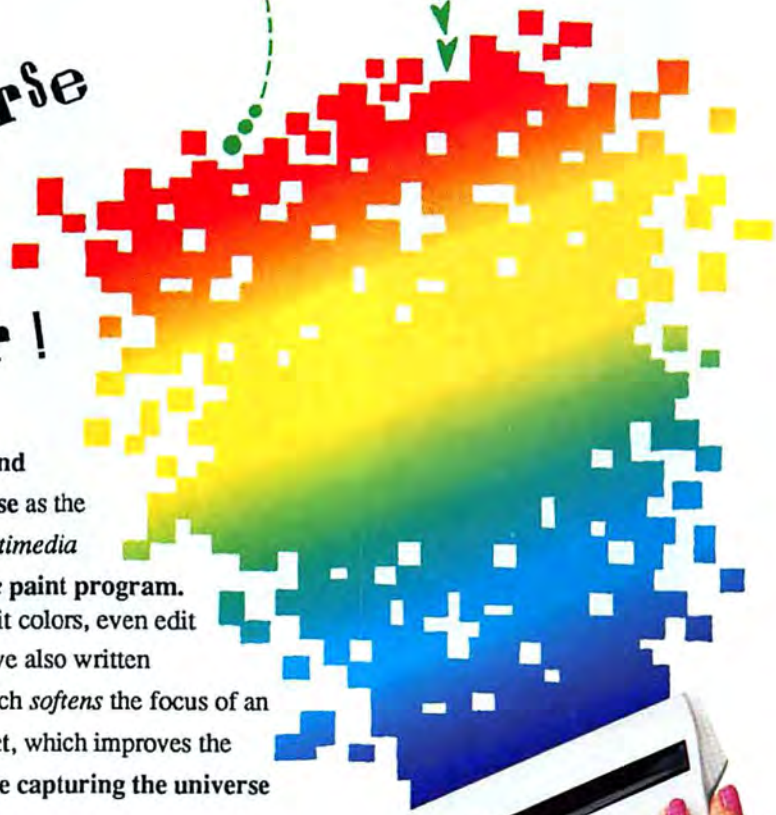
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By the editors of *Verbum* magazine

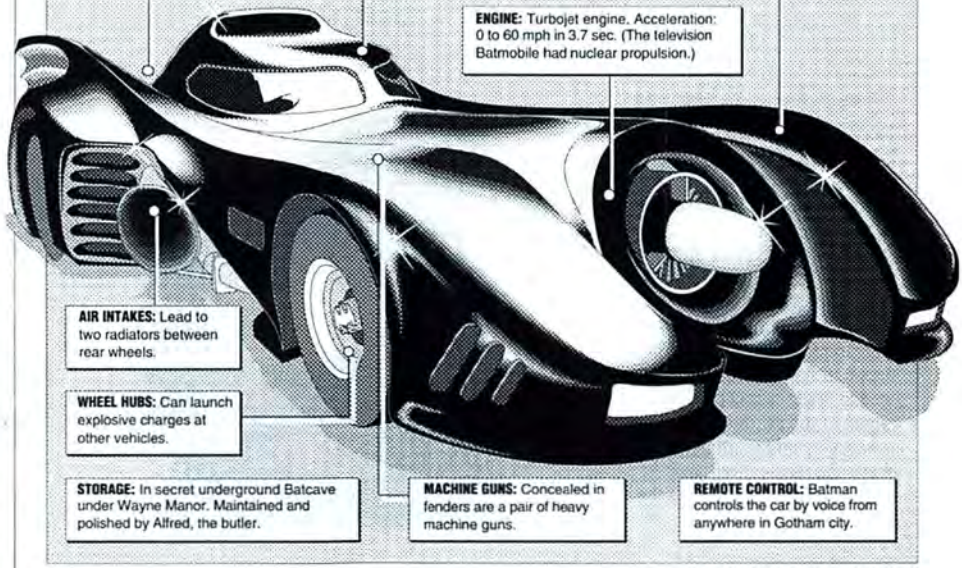
PostScript illustration programs are prized for their ability to generate graduated fills automatically, adding the illusion of light, shadow, and volume to otherwise flat art. However, non-PostScript programs such as MacDraw, SuperPaint, and Canvas can also produce artwork with realistic shading — it just requires more effort.

Bill Baker, art director at the Knight-Ridder/Tribune News Graphics Network, uses MacDraw to produce technical illustrations on subjects ranging from the Space Shuttle to the Batmobile. Because MacDraw can't generate a graduated fill, Baker models curved surfaces — such as those on Batman's famous car — by building up stacks of overlapping shapes, each filled with a different shade of gray. (The "grays" are actually fill patterns of varying dot densities.) To create the Batmobile, Baker traced its basic shapes from a scan and then built up layers of gray to simulate the highlights on the car's black body. The process takes time, but the results are almost as professional as PostScript-generated shading, especially when printed at the low line screens typically used in newspapers.

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Batman's wheels: The Batmobile

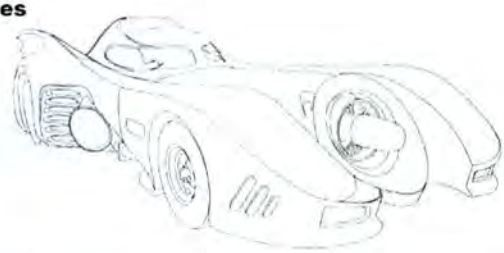
Invented by "Batman" designer Anton Furst, the sleek 20-foot-long Batmobile recalls the cars that raced on the Bonneville Salt Flats. It also bears a strong resemblance to the Corvette Stingray. Two Batmobiles were built for the movie, "Batman."



Knight-Ridder Tribune News/BILL BAKER

1 Drawing the Basic Shapes

To render the Batmobile, Baker first uses MacDraw's polygon, oval, and freehand tools to trace the basic shapes, using a scanned image as a template. The template is deleted, and each shape is given a .25-point line and a white fill.



2 Adding Flat Color

Nonreflective areas such as tires and vents are given flat colors: Each shape is selected and its fill is changed to an appropriate shade of gray. A gray shadow drawn beneath the car anchors it in space.



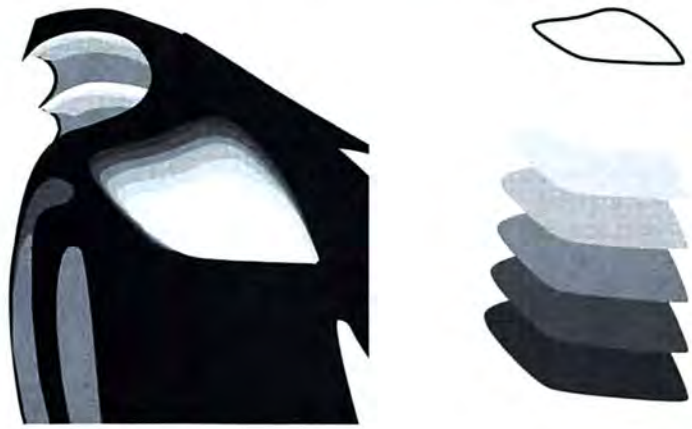
3 Defining the Background Shades

The shapes that comprise the shiny parts of the car's body will be the bottom layers for the highlighting process. Depending on the type of shading required, each shape is either filled with solid black or left white.



4 Building a Highlight

The highlights are constructed from layers of gray shapes. On the car's rear bumper, for example, seven overlapping shapes are drawn, each filled with a different shade of gray (shown here in an exploded view, with a black line around the topmost white shape). To save time, the largest shape is drawn first and then copied and pasted to place a copy directly on top of the original. The copy is shrunk slightly; filled with gray; and then copied, pasted, and shrunk again to create the next shape.



5 Adding 3-D Effects

On the front bumper, four strategically placed highlights transform the flat black shape into an object that seems three-dimensional. The highlights are created with the technique described in Figure 4. The largest highlight (over the wheel well) is set off by a star-shaped sparkle, made by drawing thin, tapering polygons filled with white.



6 The Completed Batmobile

The finished image appears almost lifelike. Before it's sent to the newspapers, the car is set in a box with a title, caption, and call-outs that describe its features (see opening art). MacDraw is an object-oriented drawing program, so images can be printed at a printer's best resolution. This image was printed on a 300-dpi LaserWriter directly from the MacDraw file; the relatively low resolution disguises the individual layers and maintains the illusion of smooth blending (but see below).

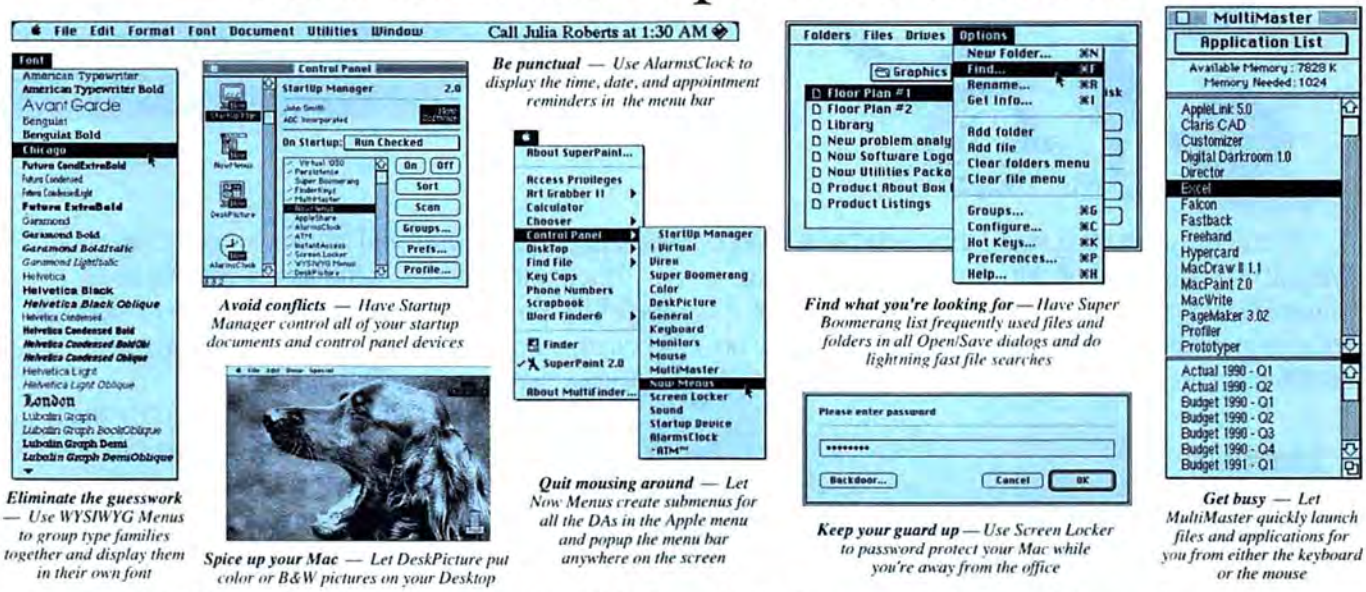


7 Converting MacDraw Files to PostScript

Canvas, Illustrator, and FreeHand can automatically convert MacDraw files to PostScript. (FreeHand does this directly; the other programs use conversion utilities.) This image was converted to PostScript with DrawOver 3.0 (part of the Illustrator 3.0 package), placed in PageMaker, and output at 1,270 dpi on a Linotronic 300. Unfortunately, the high resolution may reveal the layering process, shattering the illusion of smoothly shaded surfaces.



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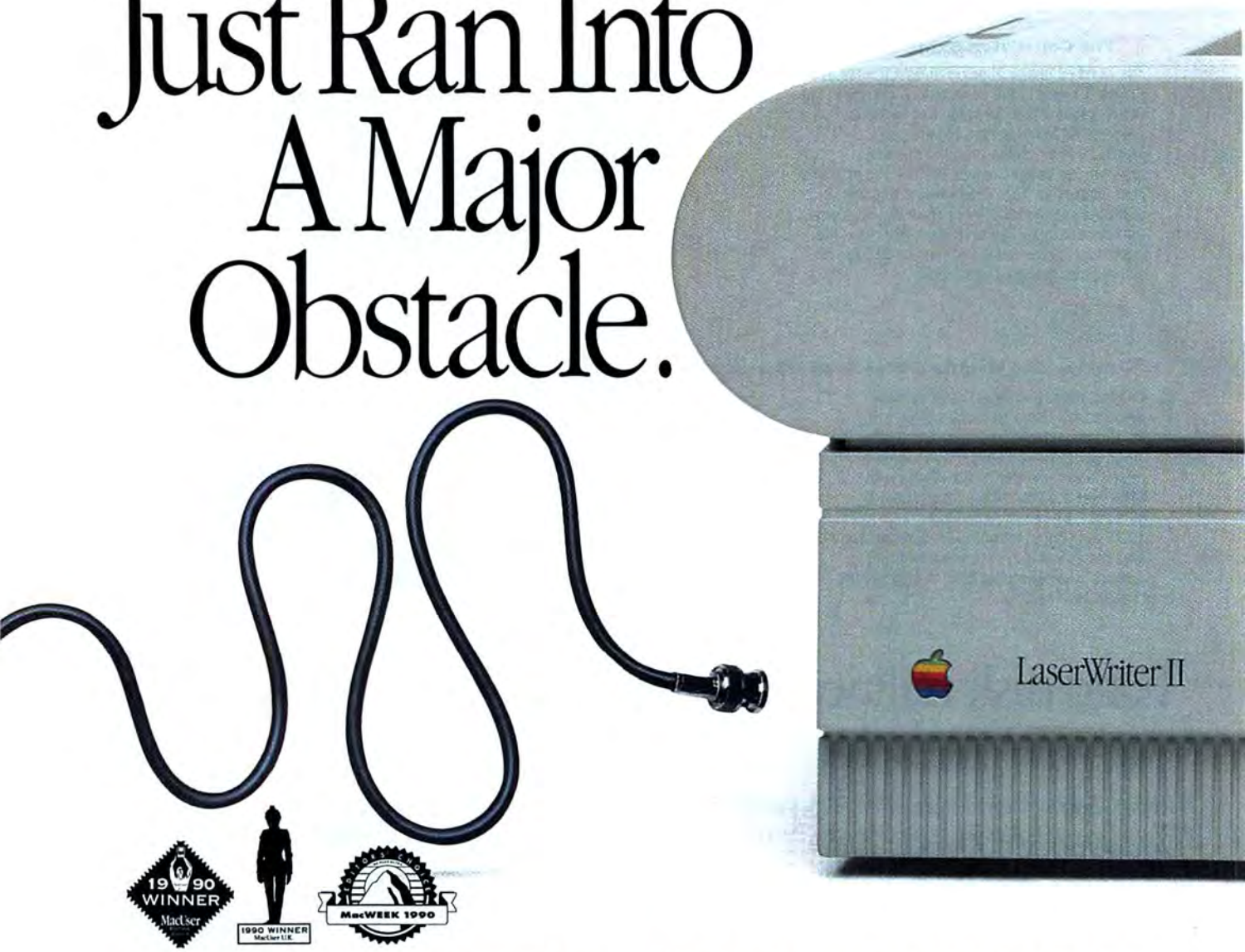
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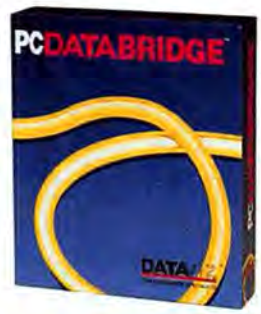
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BRIDGES

Apple has ceded the future development of AppleTalk products for DOS and Windows to Farallon. Apple's current product, PC AppleShare, lets DOS users share printers and AppleShare file servers with Macs on a network. At press time, Farallon had not announced specific product details. Intriguing news, but what I want to know is, Will Farallon also market a DOS/Windows client for Apple's DAL (Data Access Language)? And what about Timbuktu for Windows?

By Henry Bortman



Can Macs and PCs cooperate? It's nice of Farallon to pick up the ball on AppleTalk for the PC, but after you've gotten a file from Mac to DOS (or vice versa), can your software read it? DataViz wants to make sure it can. Its new translation package, PC DataBridge ($199), provides the powerful capabilities of its Mac-to-DOS product, MacLink Plus/PC, for Windows users. ✣ If you're looking to share megabytes of data, check out Software Architects' FormatterFive SCSI Driver & Utility ($150). It can format a removable SyQuest cartridge, a read/write optical cartridge, and even a hard-disk drive with both DOS and Mac partitions simultaneously. Available by the time you read this.

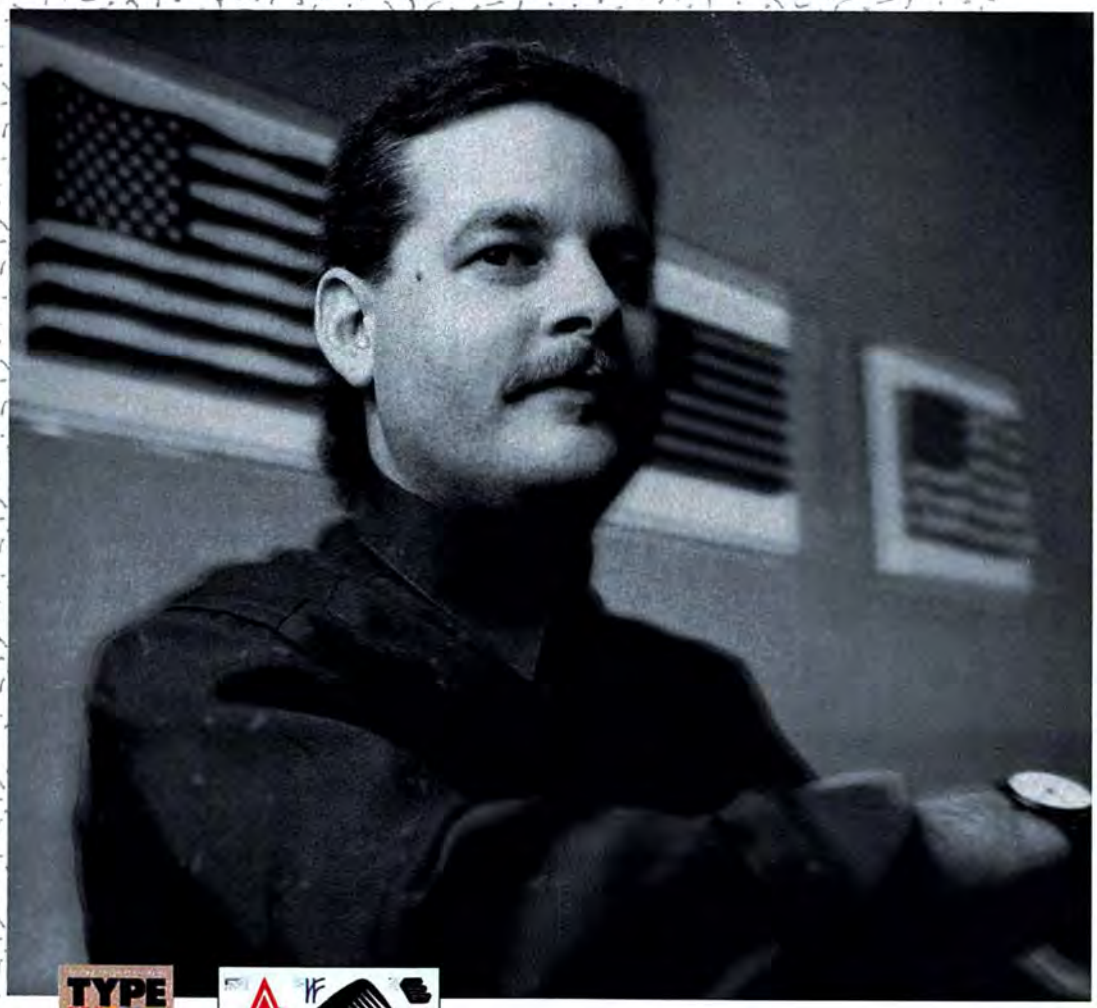
Can a PC be a Mac? I'm not talking Windows here. Cupertino-based Hydra Systems plans to ship a coprocessor card that will enable DOS machines to run Mac applications. You'll have to supply the Mac ROMs, though. Product names, pricing, and availability were all mysteries at press time. You're thinking lawsuits? Not to worry: Hydra has licensed technology from — are you ready — Xerox! This is one I've gotta see.



Can a Mac be a data server? Maybe, if it's running the multitasking A/UX operating system or if some very clever software developer does some very clever software development. Oracle announced its intentions to be clever last summer, but MacVONK USA beat it to the punch with P•INK SQL, which began shipping last December ($2,275 for the server and five clients; $375 per additional client). "Another database program," you mumble. "What's the big deal?" The big deal is that P•INK SQL does all its data processing on the server instead of shipping mounds of data across the network to be processed on your Mac whenever you do a query or a sort, the way most Mac database programs do. Definite hot-product potential.

Can a Mac manage a network? You'd think the Mac's graphical user interface and plug-and-play networking would make it a natural for this kind of stuff, but it's been a long time coming. Some products are emerging, though. Neon Software, which released NetMinder Ethernet, an AppleTalk network-analysis program, in June 1990, now also offers NetMinder LocalTalk ($395), for the Mac's built-in networking capability. ✣ And you can't really call this one network management, but Technology Works, maker of Ethernet cards for the Mac, is shipping GraceLAN, which collects such information about networked Macs as what System software, INITs, and cdevs are running; what SCSI devices are attached; and so on. $395 for 50 users. Both products began shipping in January.

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Painless Ethernet Printing

Dayna's EtherPrint provides a simple, cost-effective way to print from Macs on Ethernet. And it works.

By Henry Bortman



PHOTOGRAPHY: STEVE UNDERWOOD

In the beginning, there was LocalTalk. The Mac had it. The LaserWriter had it. To network the two together, all you needed was a couple of $30 LocalTalk or PhoneNet connectors. Life was simple. Networking was simple. Printing was simple.

Then came Ethernet. It was fast. Any Mac could have it — for a small premium. But LaserWriters couldn't. This meant that if you wanted to print from a Mac on Ethernet to a LaserWriter (or other networked printer), you needed a *router*. Routers connect networks and mediate the differences between them, such as the speed difference between zippy Ethernet and sluggish LocalTalk (see "Building a Better Network with EtherTalk-to-LocalTalk Routers," in this issue).

The trouble is that EtherTalk-to-LocalTalk routers are expensive: typically in the $2,000-to-$3,000 range. That's a lot of money to pay to connect your LaserWriter to your Mac — especially when you can do the job for less than $100 with LocalTalk. Network wiring for printing from Ethernet can add complexity and expense.

Dayna Communications has a solution: the EtherPrint ($495). Although it is *not* a router — routers maintain special tables of information about AppleTalk network-ID numbers and Chooser zone names, and the EtherPrint doesn't—the EtherPrint does have an Ethernet port and a LocalTalk port. Attach its Ethernet port to an Ethernet network, attach a printer to its LocalTalk port, turn on the EtherPrint, wait a minute or so, turn on the printer, and you're done. When you look in the Chooser, the printer appears as a device on the Ethernet network.

Now you can print as you normally would — and it works. No INITs, no configuration software, just print. (The only thing you have to be sure to do is to turn on the EtherPrint *before* you turn on your printer.) It makes you wonder why nobody thought of it before. (For details on how the EtherPrint works its magic, see the "How It Works" sidebar.)

The EtherPrint does introduce a slight delay in printing. To see how great a delay, the MacUser Labs NetWorkShop put the EtherPrint through our standard set of printer-performance tests. We compared its performance with that of straight LocalTalk printing (direct from a Mac to a QMS PS-810 Turbo) and to the performance of printing through a Compatible Systems EtherRoute EtherTalk-to-LocalTalk router. On our PageMaker test file, which included a gray-scale TIFF image and a color EPS image (see

How It Works

EtherPrint is a crafty hack that tricks AppleTalk's addressing scheme into thinking that a node on a LocalTalk network is really a node on an Ethernet network.

Every device on an AppleTalk network, such as a Mac or a LaserWriter, has a node address (a number between 1 and 254). AppleTalk devices use these node addresses to communicate with each other. Consider your LaserWriter as an example. When you turn it on, one of the first things it does is choose a node address. It then starts broadcasting "enquiry control packets" addressed to the selected node. If another device answers, the LaserWriter realizes that it's chosen a number that's already in use, so it picks another number and tries again. The printer repeats this process until there is no answer and it can have a number.

Your LaserWriter keeps its unique address until it is turned off. (Actually, it remembers the address when it is turned off and tries to use the same one when it is turned back on. Occasionally, though, another device has taken the address in the meantime, so the printer may have to find a new one.)

When you turn on the EtherPrint, it goes through the process described above to acquire an AppleTalk-node address *on Ethernet*. Then, when you turn on your LocalTalk printer, the EtherPrint tells your printer that all possible *LocalTalk* addresses are already in use — except one, the address that the EtherPrint has acquired on Ethernet.

Because the node addresses of the EtherPrint and printer match exactly, the EtherPrint becomes "invisible." Instead of appearing as a device on the Ethernet network, it causes the printer to appear as if it were a device connected to Ethernet. When the EtherPrint receives a data packet from a Mac on Ethernet addressed to its node number, it stuffs it into a buffer and then outputs it to the printer attached to its LocalTalk port. When the printer responds, the EtherPrint buffers the data again and rebroadcasts it onto the Ethernet network. Your Mac never knows the difference. All it knows is that it's communicated with an AppleTalk device that behaved exactly like a printer but had a node address on Ethernet.

Figure 1), the EtherPrint is slightly slower than LocalTalk but slightly faster than an EtherTalk-to-LocalTalk router (we used Compatible Systems' EtherRoute, which MacUser Labs rates as one of the fastest routers in its class). On Word and Excel test files, there is no appreciable difference among straight LocalTalk, EtherPrint, and through-a-router print times.

We also put the EtherPrint through a grueling three-week real-world test on a three-Mac Ethernet network, using PageMaker 4.0, FreeHand 2.02, Illustrator 3.0, Word 4.0, and Photoshop 1.0.7. It performed without a single hitch.

Our conclusion: The EtherPrint is a five-mouse winner. Of course, nobody would complain if the price were lowered $100, but even at its current price, it is a reliable and cost-effective solution to a vexing network problem.

As we went to press, Dayna had just begun shipping the EtherPrint *Plus*. This $899 model — still not a router — supports four LocalTalk devices daisy-chained off its LocalTalk port. EtherPrint owners can upgrade to an EtherPrint *Plus* for $425 within the one-year warranty period.

Get Info

EtherPrint

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Manufactured by: Dayna Communications, 50 S. Main Street, Salt Lake City, UT 84144; (801) 531-0600.
List Price: $499.
Comments: Enables Macs on Ethernet to print directly to a LaserWriter, without an EtherTalk-to-LocalTalk router.

MacUser LABS **Figure 1: PageMaker-File Printing Times**

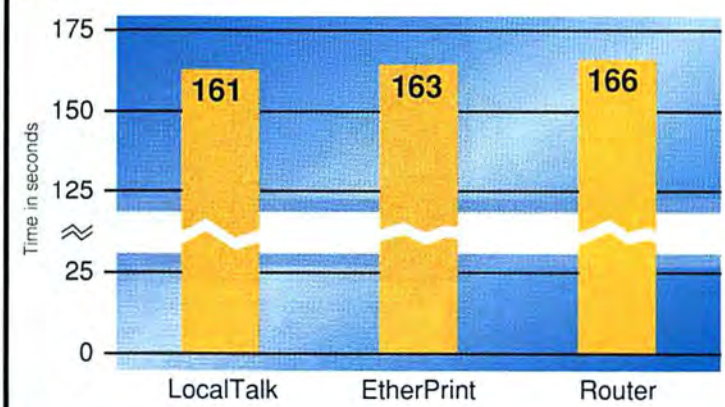


Figure 1: The PageMaker test file printed slightly more slowly through Dayna's EtherPrint than it did when printed directly to a printer on LocalTalk. However, the EtherPrint outperformed an EtherTalk-to-LocalTalk router by an equally slight margin. On simpler Word and Excel files, there were no appreciable differences.

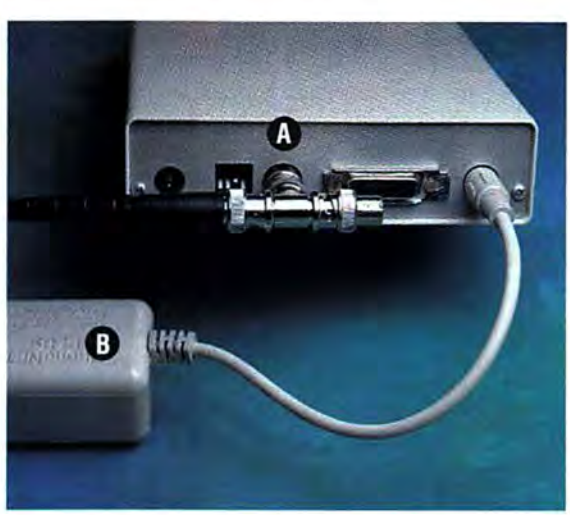


Figure 2: The EtherPrint is connected to an Ethernet network (A) and to a LaserWriter on a LocalTalk network (B), allowing Macs on Ethernet to print without an EtherTalk-to-LocalTalk router.

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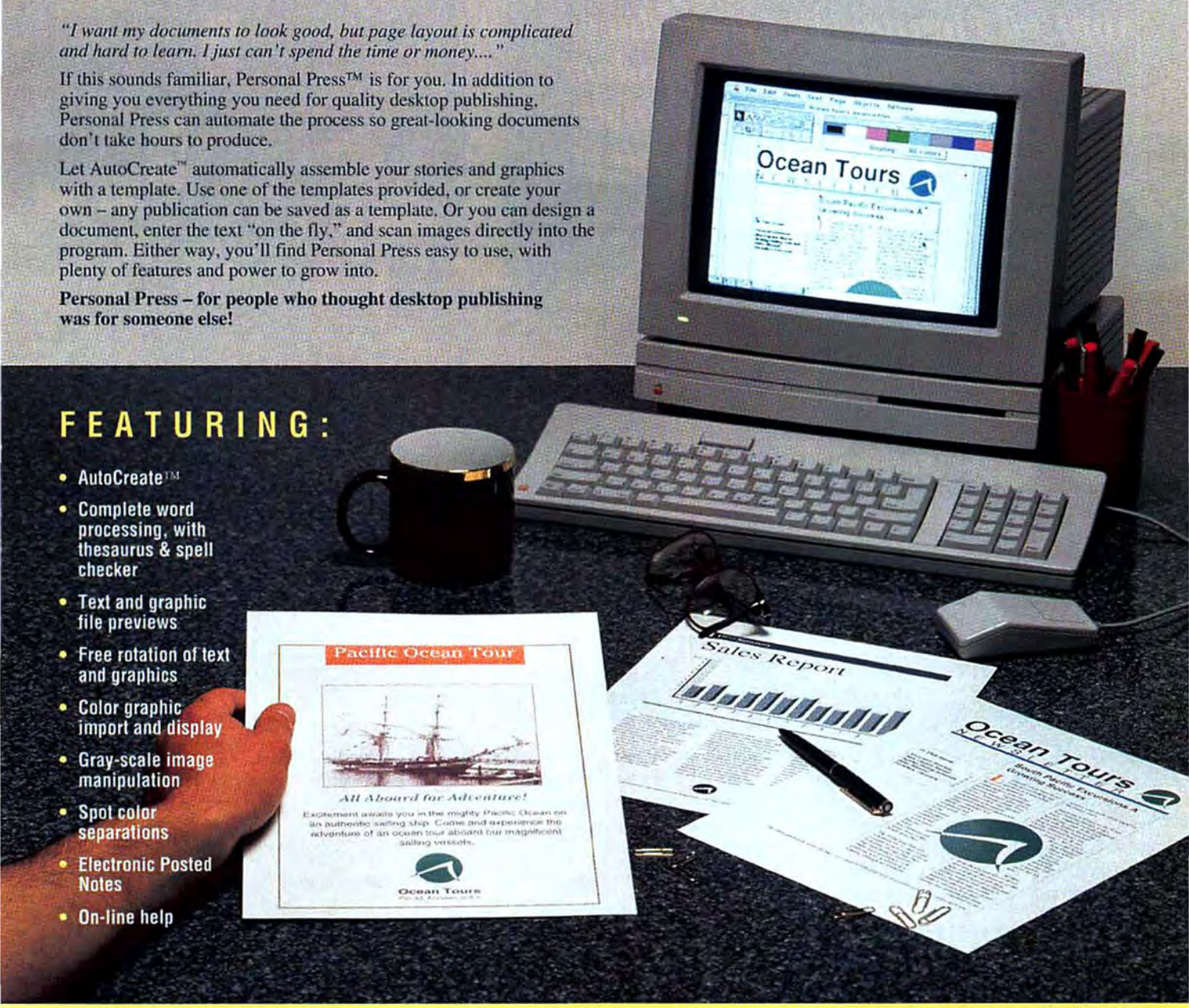
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Isolating Network Problems

Apple's Inter•Poll utility provides an excellent tool — the echo test — for determining the health of your network.

By Kurt VanderSluis

You've undoubtedly had the experience of communicating with an AppleShare server and suddenly getting slower network response than usual or losing the connection entirely. How can you tell where the problem is coming from?

The first step I use in locating these kinds of problems is to perform a procedure I call a PET (progressive echo test). I use Apple's Inter•Poll network-management utility to perform a PET. Inter•Poll contains a simple test, called an echo test, that works as follows: The Mac running the test sends a string of packets to the device being tested, which echoes them back. Inter•Poll records the number of packets returned and the number lost (a measure of the reliability of the network connection between the testing Mac and the echoing Mac) as well as the average time it takes the returned packets to make the round trip.

You can set several Inter•Poll parameters when doing an echo test, choosing short- or long-echo packets, the number of packets to send, the interval between packets, and the time-out value (how long Inter•Poll should wait for an echo response before counting a packet as lost). I typically use 100 long-echo packets at .01-second intervals with a 1-second time-out. You record the average round-trip echo time and the reliability of each test. (Note: To use Inter•Poll to maximum advantage, the echoing Mac should have the Responder INIT, which comes with Mac System software, installed in its System Folder.)

The PET procedure involves running the echo test to several different nodes along a suspect network path, recording the reliability and echo time for each test. Look at the network in Figure 1. Suppose that your Mac is the one at the top left of the diagram and that you're having trouble connecting with the server in the lower right corner. Packets exchanged between these machines must traverse LocalTalk network 1, EtherTalk-to-LocalTalk router 1, the Ethernet backbone, EtherTalk-to-LocalTalk router 2, and finally LocalTalk network 2. To isolate the trouble spot in this hypothetical network, you need to run the echo test to six different locations along the path between your Mac and the server. Although the figure shows echo packets being sent to routers, only certain routers can respond to Inter•Poll's echo test.

By graphing the results, you can spot any trends in the data. The time value in the echo test (see Figure 2) is a measure of how long a packet takes to get to the distant device and return. The graph should have a positive slope as you test successively distant devices. It's normal to see a longer echo time through routers than within a single LocalTalk network. What you need to look for is an instance

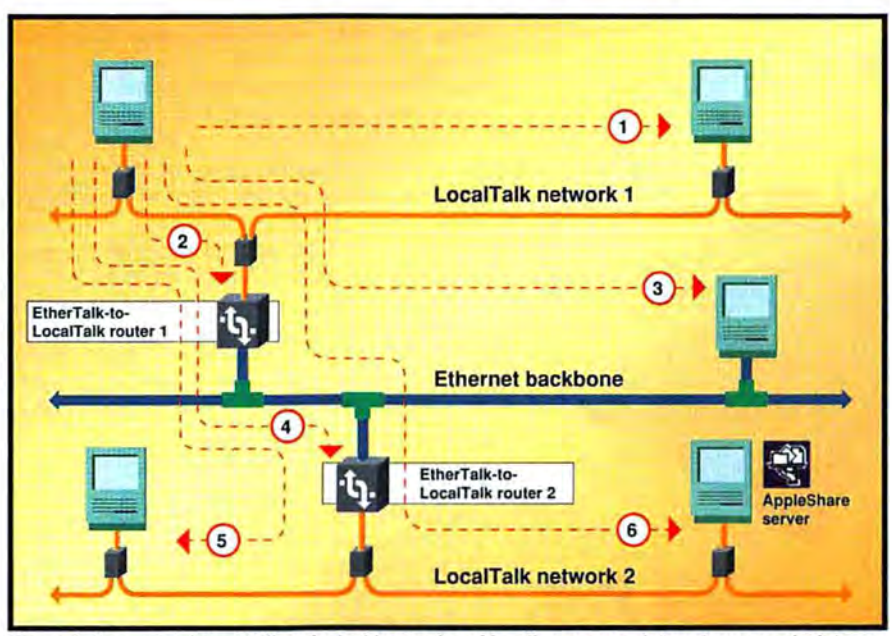
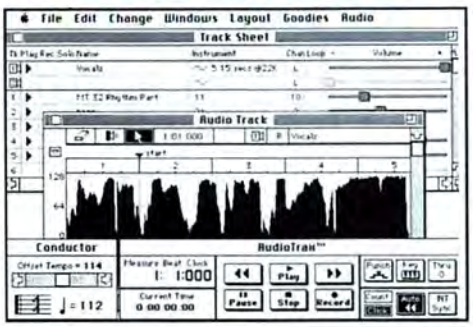


Figure 1: By running Inter•Poll's echo test to a series of locations on your internet, you can isolate an area for further troubleshooting. (Not all routers support Inter•Poll's echo test.)

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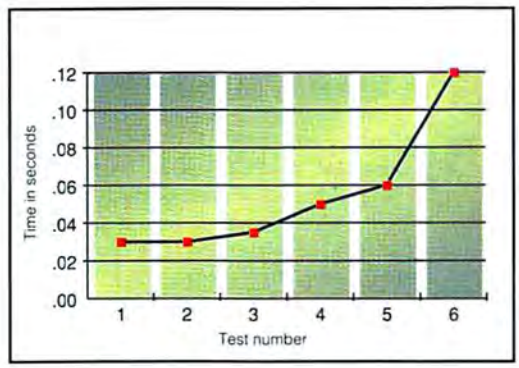


Figure 2: The sharp increase in the average echo time between tests 5 and 6, although both these nodes are on the same network, is an indication that the AppleShare server is overloaded.

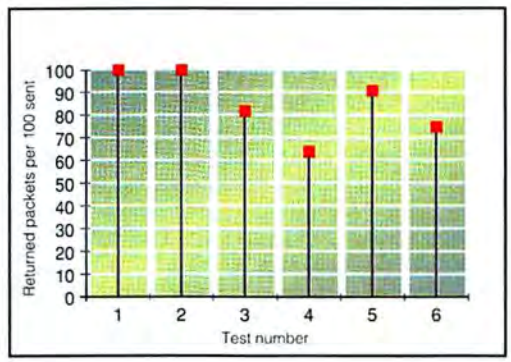


Figure 3: The sudden drop in reliability between tests 2 and 3 is an indication that there may be a problem with either router 1 or the wiring on the Ethernet network.

in which the time jumps significantly. The time difference between test 5 and test 6, for example, is larger than a couple hundredths of a second. This could mean that the server is very busy, it may take longer for it to return an echo packet. It may be running slowly because there are a lot of people logged on to the AppleShare server or because the server is sending or receiving large files. You can check these possibilities by looking at the AppleShare display screen. You can correct this problem by putting a faster hard disk onto your server or using a more powerful Mac as the server.

But even if the server is not busy sending or receiving files, if it has many users logged on, it can be slow to respond to an echo test. A server must exchange "Hello" packets every few seconds with each Mac that's logged on, even if some of the Macs aren't active. You can solve this problem by asking users to log on to the file server only when they're actually using it.

The reliability value in the echo test is affected by wiring issues and link integrity. Performing a PET doesn't necessarily tell you what's causing the problem, but it may suggest where to start looking. If there is a place where the reliability plummets suddenly, that's a good place to look for a problem. If the reliability drops between tests 2 and 3 (see Figure 3), for example, the culprit may be router 1 or it may be on Ethernet. You can determine this by running an echo between two Macs on the Ethernet network without going through a router. If that's where the reliability is bad, then the router is not at fault and you should look at Ethernet's termination and wiring.

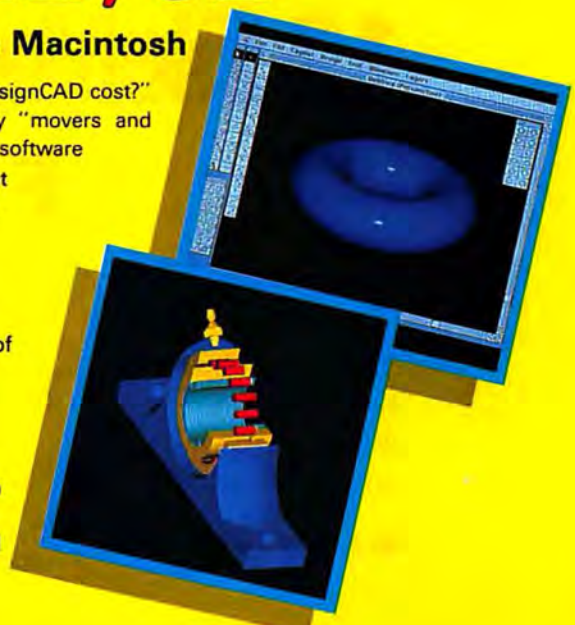
As with any testing tool, you should perform a PET when the network is working properly so that you have values to compare with when you're troubleshooting problems later.

When you send 100 echo packets within a single LocalTalk network, you should get 100 back, assuming correct wiring, but it's normal to occasionally lose a packet through two routers. You need to learn what to expect. The time of the echo varies because of many factors, such as what kind of CPU the distant device has, how busy it is, how busy the network is, and so on. By performing a PET at different times under different network-load conditions, you'll know what's normal. If you're trying the PET across modem links, you may need to increase the time-out value. Through a modem link, such as two networks connected by Liaison at 9,600 bps, it takes longer than a second for an echo packet to return. Try a nice long value such as five seconds.

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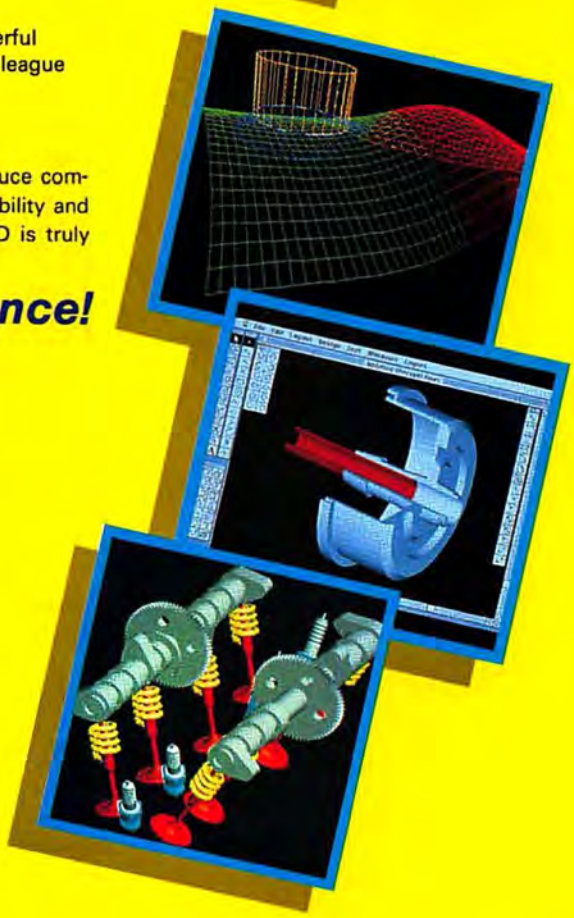
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12 FileMaker Pro Tips

Planning to use FileMaker Pro? Here are 12 tips and workarounds that you can't afford not to know. You'll save time, and more importantly, you might save your data.

By Craig Danuloff

FileMaker is an extremely popular database program, primarily owing to its straightforward design — almost anyone can create and manage a FileMaker database. Claris' recent FileMaker Pro upgrade introduced several new capabilities, but it also inadvertently created the need for a few workarounds — ironically, because of a file-structure bug that existed in earlier versions of the program but was fixed in this new one.

The tips included here document the most important of these new workarounds and describe some techniques that you might not have discovered while working in FileMaker.

1. Don't upgrade your FileMaker II files simply by opening them in FileMaker Pro.

Apparently, a bug in FileMaker II creates a structural problem in its files. The bug was fixed in FileMaker Pro, but the problem might still be present in your old FileMaker data files and could cause serious problems if you convert them to FileMaker Pro by opening them directly from that program.

The workaround is simple, but Claris didn't include it in the FileMaker Pro documentation. Save a compressed copy of your FileMaker II files by using the Save a Copy command. Then open these compressed copies in FileMaker Pro.

If converted files exhibit any strange behavior — trouble with sorting, for example — use FileMaker Pro's Recover command to attempt to correct the problem.

If problems still exist — which should rarely happen — return to your original FileMaker II file and export all its records to a tab-delimited file. Save an empty copy of your FileMaker II database, using the Save a Copy command; open the empty copy in FileMaker Pro, and then import the data from the tab-delimited file. When using this method, make sure that all fields are lined up

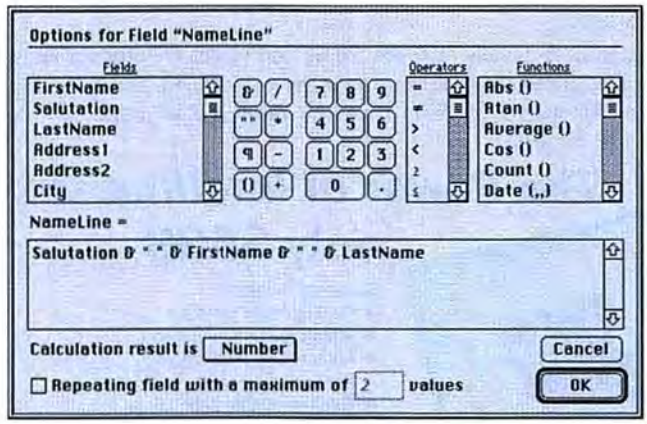


Figure 1: Despite FileMaker Pro's improved sliding capabilities, it's still a good idea to concatenate field names if you want fields to print without extra spaces between them.

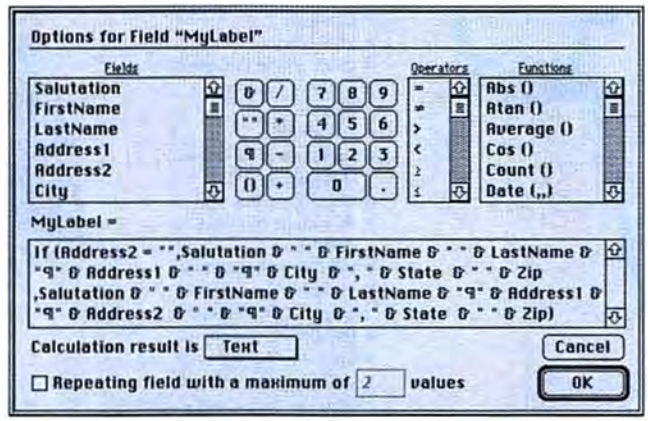


Figure 2: Using the If statement and carriage returns, you can ensure that objects slide up in your layout.

correctly in FileMaker Pro's "Specify field order for import" dialog box.

If you've already converted your FileMaker II files and haven't experienced any problems using them in FileMaker Pro, there's no need to go back and reconvert. You'll know immediately if you're going to have any problems caused by the old FileMaker II bug — they don't appear gradually.

2. Export tab-delimited files instead of SYLK files if you need to use your data in a spreadsheet.

FileMaker Pro exports numeric and calculation fields into SYLK files as text, not as numbers, making it impossible to perform mathematical calculations with this data after you've imported it into a spreadsheet. These fields are treated as numbers in tab-delimited files, though, and virtually all spreadsheet programs can import tab-delimited files accurately.

3. Concatenate fields to ensure proper "slide left" and "slide up" operation.

The easiest way to force horizontally arranged fields to slide in layouts is to use the Arrange menu's Slide Objects command, which is available in the Layout view only. This method sometimes proves unreliable, so you may want to force your fields to slide by using concatenation.

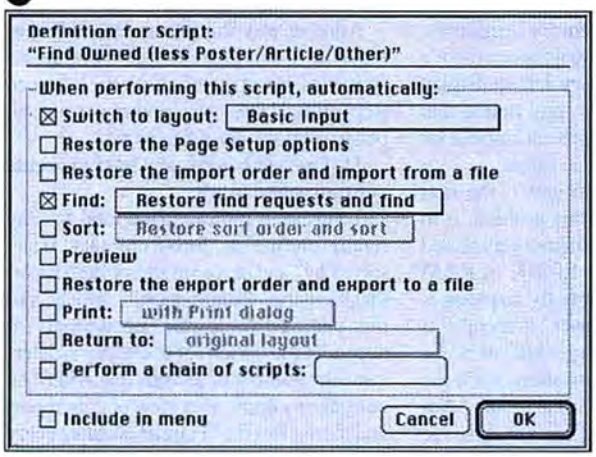
Concatenation requires creating a new field for each record in your database and instructing FileMaker Pro to add the information from several other fields to this new field. To create the name line on an address label, for example, create a new field called NameLine and define it by using the following formula: `Salutation & " " & FirstName & " " & LastName` (substitute your own field names for `Salutation`, `FirstName`, and `LastName`). Then place the NameLine field instead of the Salutation, FirstName, and LastName fields in your address-label layouts (see Figure 1).

You can use this same trick to ensure that objects slide up: Use a carriage return and the If statement to define multiple lines in a single field. The field definition shown in Figure 2, for example, would place all the necessary data in the MyLabel field, using the Address2 field only if it was not empty.

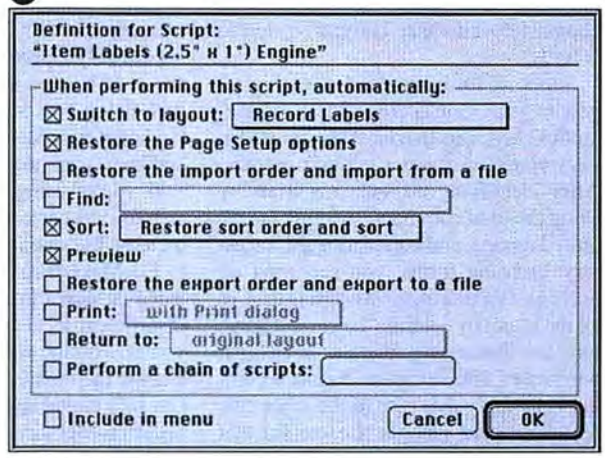
4. Perform the Find command in one layout, and view data in another.

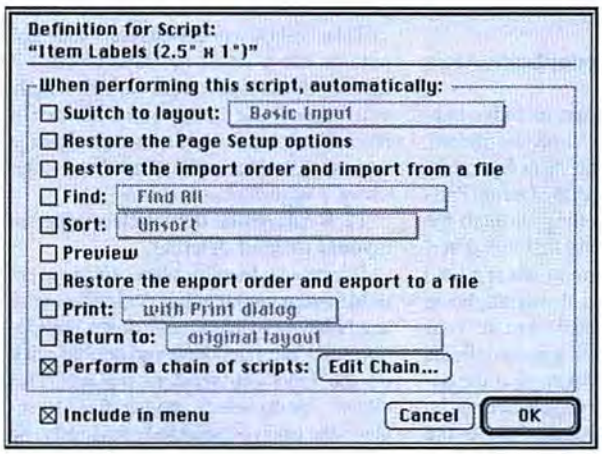
Often you will want to view a subset of your records in a layout that doesn't include the fields that define the subset. You may, for example, want to print mailing labels for all clients who have purchased more than $5,000 in goods during the past year. Because the field

3a



3b





3c

Figure 3: These three scripts show how you can define two separate actions in two separate scripts (3a and 3b) and then combine them with a third script (3c) so that FileMaker Pro can perform actions that would be impossible with just one script. In this case, you can search on a field that's not included in the mailing-label layout.

containing your clients' year-to-date purchases is not on the mailing-label layout, you should execute the Find command in a generic layout and then switch to your mailing-label layout before you print.

This procedure can't be automated with a single script — FileMaker Pro will fail to execute the Find command, because it requires a field not present in the final layout.

Therefore, you must create three scripts: one that selects the layout containing the necessary field and then performs the find (see Figure 3), one that specifies your mailing-label layout and the required printing options, and a third that runs the first script and then runs the second script by using the "Perform a chain of scripts" option. Do not include the first or second scripts in the menu or assign keyboard shortcuts to them.

5. Take advantage of the Replace command.

Many people don't understand the Replace command and perform unnecessary data entry as a result. The Replace command lets you enter data into a single field in the current record and have that data copied into all other currently selected records.

Suppose, for example, that you're renewing your state licenses for all the hazardous chemicals that have been stored in your warehouse under expired permits. After identifying all such materials by using the Find command, printing the required reports, and completing the necessary licensing forms, you can reset all license-expiration dates (assuming they're all the same) by entering the correct value into the license-expiration-date field of one record and using the Replace command to apply that date to the other currently selected records. Be certain that you've selected the correct subset of records before confirming the replacement — you can't undo the Replace command.

6. Use Page Setup to adjust the Layout marker.

In the Layout view, FileMaker Pro displays striped lines that represent page borders. These borders' calculations are based on the current settings in the Page Setup dialog box, so be sure to configure your pages horizontally or vertically and to specify any printing reductions or enlargements before finalizing your layout.

Using reduction is a good way to gain some extra room to fit all required data onto a layout. If you use this technique, create a script that switches to the layout and uses the "Restore the Page Setup options" option so that your reduction is applied every time you use the layout.

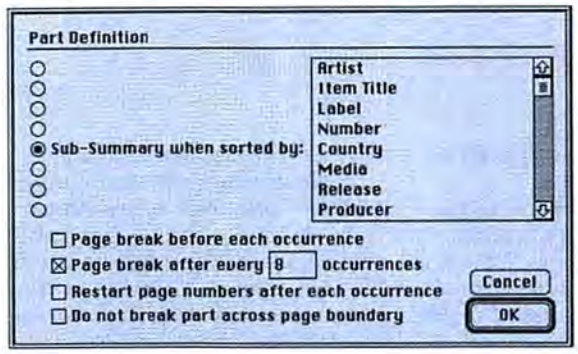


Figure 4: To create a running page total for any report, you need to figure out the number of records that will print on each page and then insert a page break with a subsummary part after that number of records.

7. Hold down the Option key to customize the position of part boundaries.

When you're defining layouts, the gray lines that define part borders (such as headers and footers) cannot normally be moved past any fields, text, or graphics. If you hold down the Option key while you're repositioning the part border, however, you can move the border freely.

8. Give FileMaker Pro sufficient memory.

When FileMaker Pro runs short of memory, the "Out of memory" error message usually appears. In some cases, there's not even enough memory left to display this dialog box, so you may notice that keyboard equivalents or menu commands suddenly seem to have no effect.

If you're using MultiFinder, the first step toward correcting this problem is to increase the amount of memory allocated to FileMaker Pro. The 1,024K of RAM that FileMaker Pro normally requests is insufficient in many cases, especially if you're working with large databases. To change the memory allocation, open the Get Info dialog box and change the "Application Memory Size" option. Provide 1,500K as a minimum — more if you have enough memory available and work with very large databases.

9. To avoid printing duplicates, use a subsummary part.

To create a layout that includes only one occurrence of any duplicate record, define a layout using the "Sub-Summary when sorted by" option in the Define Parts dialog box. When scrolling through the field list to select the field that will determine duplication, be sure to select a field that will be unique for all nonduplicate records. Remove the body part in your layout, and position all required fields within the subsummary part. Sort the database by the field you've selected to determine duplication, and choose the "Preview" option from the Select menu. The resulting duplicate-free database is then displayed. Choose the Print command to print this data.

10. Use the "Blank" layout option instead of the "Columnar report" layout option to produce columnar reports that contain repeating fields.

Repeating fields do not slide up properly in columnar-report layouts. If you have an existing columnar-report layout containing repeating fields, copy all its elements and paste them into a new blank-format layout.

Another way to improve the sliding of repeating fields is to choose Field Borders from the Format menu, check the Between Repeating Values box, and make sure all border options are set to None.

11. Use a subsummary part to create running page totals.

To create a running page total for any report, define a "Sub-Summary when sorted by" and place summary field types, that have the "Running total" option, into this part. To force this subsummary to appear at the bottom of every page, determine the number of records that will fit on one page by doing a preview of your report and then select the "Page break after every *X* occurrences" option and enter this value (see Figure 4).

This method works best if no "slide up" options are used in the report body. If records in your report are of variable length, you must choose the minimum number of records that naturally fit on a single page and use that value in the "Page break after every *X* occurrences" option.

12. Replace one field with another in layouts without deleting.

If you accidentally place an incorrect field in your layout or just decide that your needs have changed, hold down the Option and Command keys and double-click on the field you want to replace. This allows you to select another field to replace the one you selected previously.

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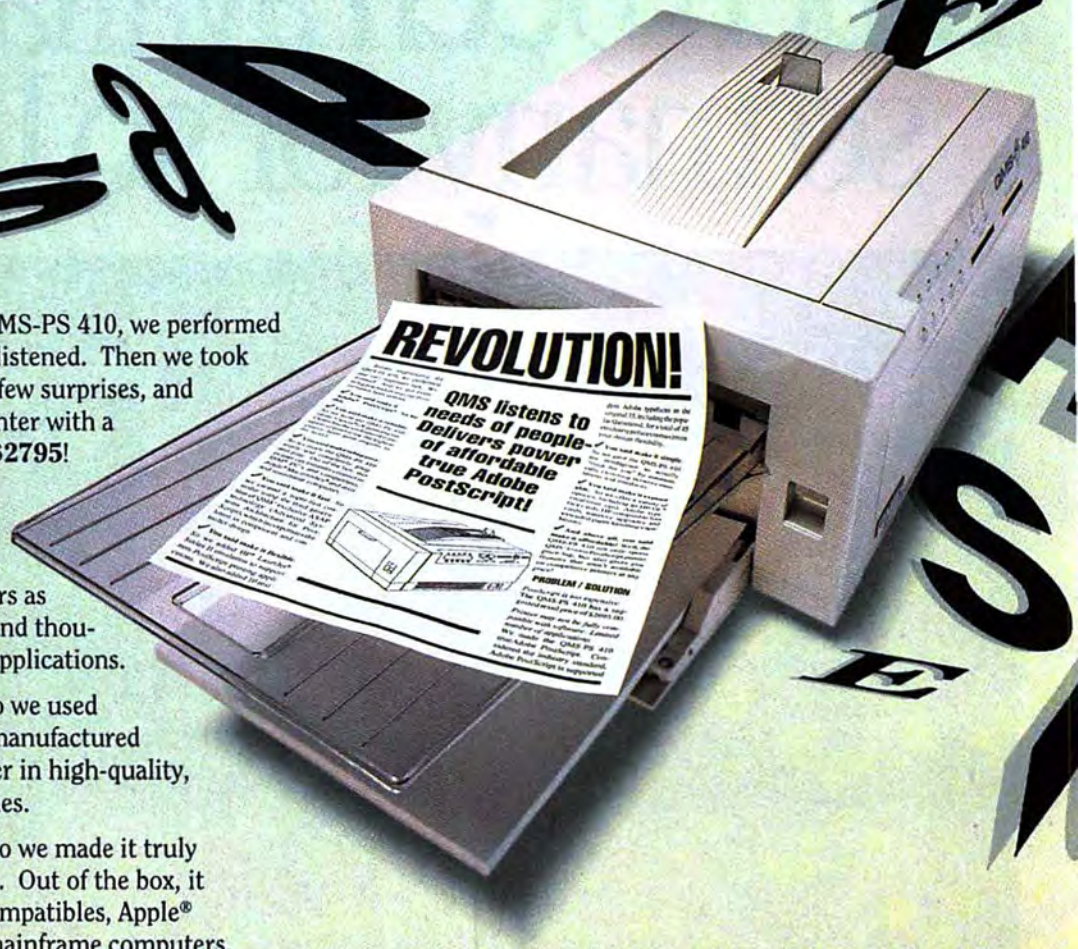
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Lighting the Way

Microsoft chairman Bill Gates expounds on Windows — and looks at some other architectures of the future.

By Michael Swaine



Pointers to the future are most easily grasped by the handles of the past. That's why writers who wade into deep technical waters sometimes lapse into the folksy, anecdotal style of presentation that *Byte* and *InfoWorld* columnist Jerry Pournelle calls "Me and Ed Went Fishin'." In the broader journalistic world, this style — usually seen in the work of small-town newspaper columnists who spend a lot of time with the boys down at the firehouse — is known as "slipping into one's anecdotage." This month's exploration of the future of system software, as mapped by Microsoft chairman Bill Gates, doesn't dwell on the antics of the cowlicked cartographer, but a couple of stories do slip in.

For starters, there's the one about the light in the night: It seems there was this Navy cruiser, you see, and late one night, the officer on watch noticed a light in the distance, dead ahead. According to the conventions of navigation, he signaled the other vessel to steer to starboard. A message promptly came back: "You steer to starboard." The officer huffily fired back a message informing the other vessel that his was a Navy cruiser and that he would make no such move. Time passed with no response, and the watch officer reluctantly woke his ranking officer, an admiral. The admiral lost no time in informing the other vessel of the most relevant fact of the situation. "I am an admiral," he signaled. The response: "I am a lighthouse."

I heard that story a few months ago when Bill Gates gave a speech at Comdex. It wasn't the only time recently that I'd heard Gates speak; these days he's been lecturing to many different audiences, always centering on a topic he calls "Information at Your Fingertips." As founder, chairman, CEO, and principal stockholder of Microsoft, Gates can define his own job. At one time, that definition meant writing code, but now it seems to be to appear suddenly in front of large ships of industry with a beacon shining from his forehead. Gates is the unexpected lighthouse.

What he does when he speaks publicly is to prognosticate. Bill Gates' prognostications are worth listening to, although the audience can't help but wonder to what extent listening to his predictions helps bring them about. Buyers, sellers, and developers of computer hardware and software have the choice of ignoring Gates' predictions — at the risk of running aground on the Microsoft shoals — or of helping fulfill them. A purveyor of self-fulfilling prophesy is, I guess, a self-fulfilling prophet, and Gates' presentations are no doubt both self-fulfilling *and* profitable.

Gates is most interesting when he is talking about system software, which is what he is usually talking about. Whenever he sketches the possible future capabilities of computers or advises on opportunities for software developers, it's a good bet that he's really talking about system software. And what he has to say is as relevant for the future of Mac system software as for DOS-slash-Windows-slash-OS-slash-2, because under the foam, it's all one archipelago.

Here's a look at some of the low-lying land

over which Gates has played his light of late. Software developers, Gates claims, have little idea of what to do with the increasing raw horsepower available on the desktop. He sees the desktop computer as "certainly" moving past 10 MIPS (million instructions per second) to 50 or 100 MIPS in the next two years. Developers will need to come up with high-volume software to take credible advantage of that power.

One way to do this is to increase the size and complexity of the information being processed. That's part of what's behind the multimedia push; graphics, video, and sound require a lot of storage space and a lot of processing power. But high-end machines already have sufficient power to handle 8-bit-color still images, and DSP chips have already made it possible to do complex audio input and output, text-to-speech and speech-to-text conversion, voice mail, and audio text within applications. We don't *need* faster hardware for these things. Even handwriting recognition is turning out to be something that current hardware can handle. Although a graphical user interface and support for graphics applications have become standard and sound input is just about to become standard on current-generation hardware, users have yet to be sold on live video and realistic color depth in images to justify the next generation of hardware.

In talking with developers, Gates emphasizes this opportunity angle, but no matter whom he's addressing, he soon moves on to a very user-oriented topic — the broad area he calls "Information at Your Fingertips."

From the user's perspective, "Information at Your Fingertips" means something like this: You confront the machine to get certain kinds of information, such as schedules, mail, or whatever. The storage model of the machine (and that of any other machines accessible from it) has been transformed so that access to any particular kind of information is simple and intuitive. Of course, all software vendors claim simplicity and intuitiveness for their software; the point here is that access should be simple and intuitive for the particular kind of information you're interested in — whatever it might be, wherever it might be, and whatever you might be doing at the time (even if you're using an application that isn't designed to work with the kind of information you need, for example).

Gates is obviously not talking about a DOS-style hierarchy of eight-character filenames here, or even about the Mac's hierarchical file system. He predicts that Microsoft will produce an operating system that works this way in two to three years, and Apple has the same kind of thing in the works, due sometime after the advent of System 7.0. Parts of this approach will be arriving this year and next, however, on Macs and other systems. The file system in System 7.0 will take a big step toward indifference to physical location, although it will still just catalog hierar-



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chies of filenames.

This "Information at Your Fingertips" vision requires a few new features in the system software — such as embedding and linking (to use the Microsoft terminology) or publish-and-subscribe and AppleEvents (to use Apple's terminology). In either case, the idea is to allow applications to share capabilities, so that if you need to attach a voice annotation to a document you're working on, it doesn't matter whether or not the application's author included voice-recognition features.

The publish-and-subscribe capability of System 7.0 is another example of the promise of shared capabilities: When communicating with another person, sometimes you want to point to a particular object — a spreadsheet, say. Publish-and-subscribe lets you establish a part or all of the spreadsheet as a "publication" to which other documents can "subscribe." Changes in the original document are automatically reflected in the subscribers. The difference between this approach and referring to a copy of the spreadsheet pasted into another document can be extremely important, as, for example, when the data in question involves credit or stock prices. It's the difference between *hoping* that you're talking about the same thing and *knowing* that you are.

To make this phase of "Information at Your Fingertips" happen, system-software vendors need to create system-level tools as well as publish and support standard protocols for communication among applications. Then it's up to application developers to take advantage of these tools and protocols. Apple (in System 7.0) and Microsoft have built the tools and started the protocol process moving, and Gates is telling developers of the "huge opportunity" this represents. The developer response to both architectures has been a little slow, but Apple and Microsoft have application-software divisions, with which they can prod the process along.

If the "Information at Your Fingertips" vision is to become real, the second thing that needs to exist at the system level is increased connectivity. Some connectivity — such as point-to-point E-mail — is easy, but sharing information for collaborative work is tricky. The problem is not so much with databases where the level of granularity is the record, which is small and manageable. Collaborative databases are relatively easy to maintain. Things get more difficult when you try to support collaborative work throughout an office *across* applications or even in a single application such as a spreadsheet program.

If it's hard to imagine doing collaborative work across applications on your network, that's not surprising. We need faster networks, and part of the solution is new hardware. Faster processors will mean more-powerful servers. And it looks as if the transmission bottleneck can be broken, if research done at Spectra Physics is any indication. Although Gates limits himself in his talks to discussing near-term research and development, work in

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fiber optics at Spectra Physics has produced stable pulses as short as four-trillionths of a second. This translates, theoretically, to the ability to transmit the contents of the Library of Congress in five minutes. Now *that's* information at your fingertips. Although you can't expect 0.2-LOC-per-minute performance from your network any time soon (to use *MacUser* technical editor John Rizzo's unit of choice), it does suggest that the physical location of the information you need is going to become progressively less important.

That fact takes on greater significance when we reflect on the shift in the software industry from being "an industry that sells code," as Gates puts it, to an information industry, producing information-rich products such as encyclopedias, catalogs, and demographic databases. Gates foresees a day when the balance will shift from code to information, but he isn't predicting when that day will come. We'll know it, he says, right after it happens.

Implementing "Information at Your Fingertips" will require at least the things I've mentioned, but the most important feature will be the new storage model. The model is object-oriented storage, but Gates is careful to point out that there are at least three broad uses of this "object-oriented" terminology. The most important change will not be the change in the programming languages or even the change to the window/icon user-interface metaphor. The most important change will be the move to an object-oriented storage philosophy. This means access to information based more on content than on external structural conventions such as filenames.

From the users' perspective, the new model may be less an addition than a subtraction. The new storage model that Microsoft and Apple are working on will throw out a lot of unnecessary stuff, such as hierarchies of filenames or even, perhaps, the files themselves. Ted Nelson, who coined the term *hypertext*, wrote passionately about the tyranny of the file decades ago. With this new storage model, the software industry may finally get its long-needed System Instruction 9.

Let me explain. Last New Year's Eve, I listened to a band called System 9. When the festivities ended, I asked one of the band members where the band's name had come from. It had come from a telephone-company memo, he explained, that had fallen into the band's hands. The memo reminded telephone-company employees that they could throw away memos and other clutter for which they had no obvious use. The justification: System Instruction 9. This magic formula is, evidently, the converse of Catch-22, an Out rather than a Catch.

What we need in system file storage is a System Instruction 9. It may indeed take Apple until System 9.0 to put this Out in. It's definitely not in System 7.0. But when System Instruction 9 arrives, it will be the most significant development in system software in many years. Gates is not wrong to call it "the new GUI."

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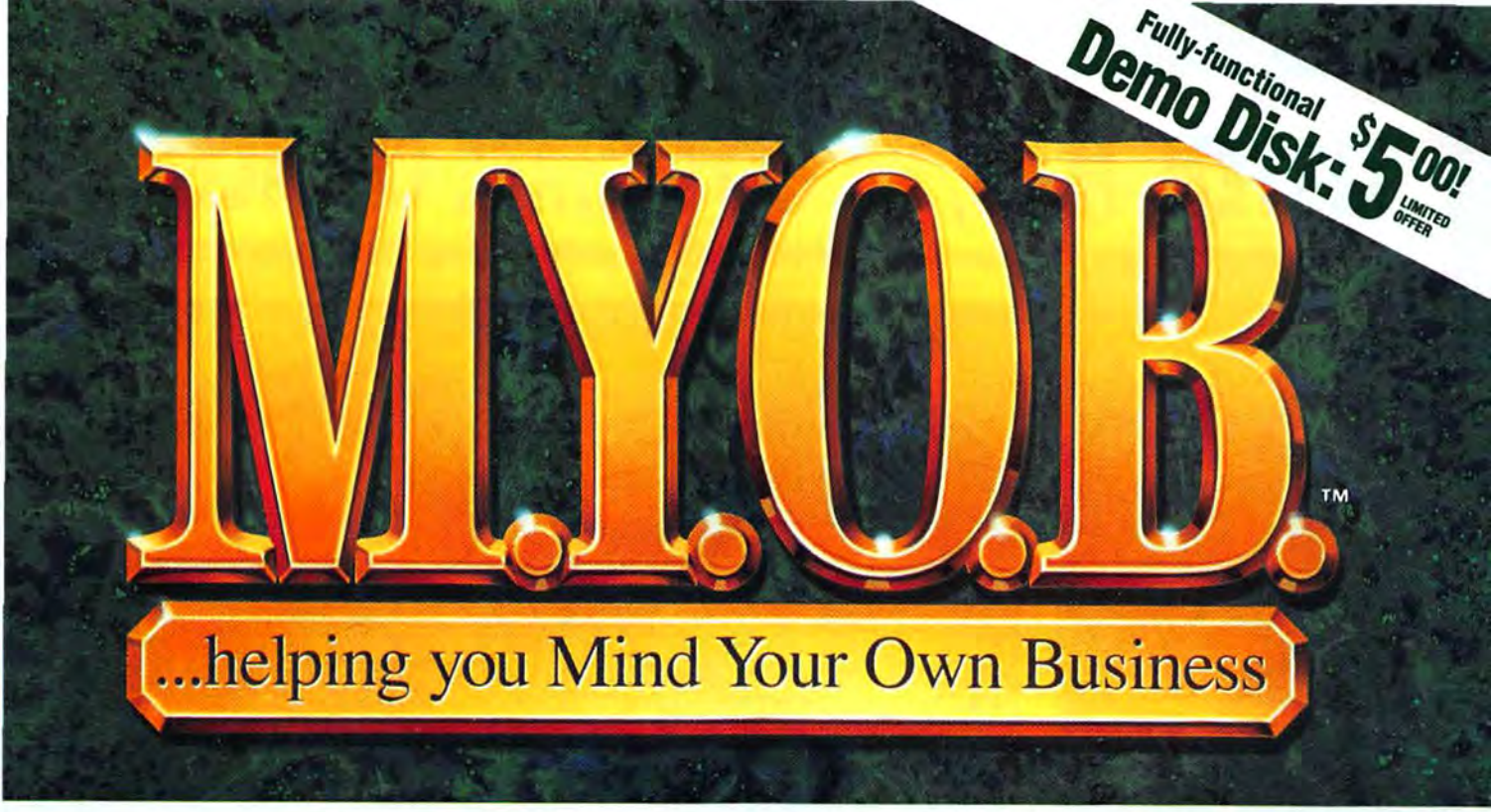
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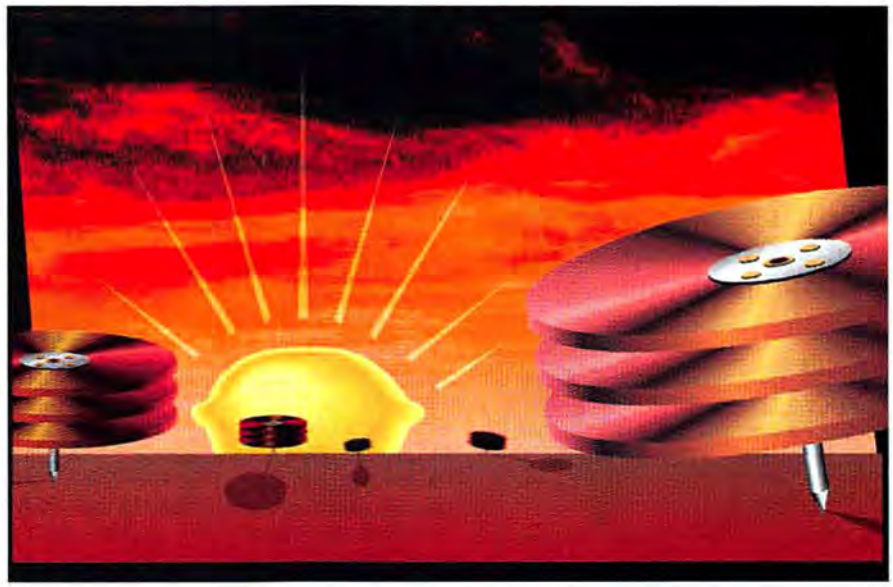
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The Expert's Pledge

After spending some late nights with his chemistry set, our intrepid columnist discovers that you too can achieve waxed beauty every time you write a sector.

By Thom Hogan



Avid audiophiles have long had a reputation for tweaking their hi-fi systems with abandon. They pour strange concoctions onto connectors and LPs, hunt for cables made from exotic materials, and are never happier than when debating the relative merits of filling speaker stands with sand or small metal pellets.

Perhaps the most audacious tweaks these golden-eared folks have discovered are those involving compact discs. Now, CDs are supposed to be all digital. Bits are bits, right? Why should rubbing Armor-All on a CD make it sound better? You can't tell me that Armor-All does something to the bits that makes them more musical. And why does painting the outside edge of a CD green make it sound better? What, moreover, are we to make of mounting little rubber rings on our discs or the practice of scratching the inner and outer edges of a disc with sandpaper? But get this — the *latest* craze is cryogenically freezing discs to make them sound better.

Realistically, of course, because CDs comprise digital information, few of these actions should have any effect on the sound. Digital bits don't change just because you've rubbed some chemical on them or deep-frozen them. But report after report from people whose ears are trusted by thousands tell us that diddling with a digital disc makes a huge difference in its musical properties.

Is it possible that the same thing holds true for computer disks? There must be some simple tweaks that computer users can employ to make our machines operate better, more smoothly, and more efficiently.

Left with a couple of slack weeks at Christmas, I decided to give it a try. Now, my offices aren't exactly MacUser Labs, and I don't have the Labs' sophisticated testing equipment, but I do have my fair share of electronic toys. Besides, I was looking for effects that are observable and repeatable by anyone. I didn't care if a line was slightly flatter on an oscilloscope; no, I was looking for things that you and every other reader could use.

Funny thing is, I found one.

Once I got past the silly ideas (such as whether spreading peanut butter on the mouse ball would make it grip the mouse pad better), things started to gel. The first test I tried had such startling results that I had to rethink many of my preconceptions and wonder whether equipment manufacturers are really paying any attention to the engineering side of things.

One of the relics in my closet is a crashed 60-megabyte drive. Long ago I tried virtually every software and hardware tool at my disposal to resurrect it. (Basically, it wouldn't boot or save new files correctly — every time it wrote to the disk, a new bad sector was introduced, and the boot problem meant that it apparently wasn't reading the outer tracks of the first platter well either.) I instinctively knew that neither Armor-All nor any of the other wonder products the audiophiles raved about was going to work on this baby — CDs, after all, are made of plastic (which Armor-All is designed

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for), but hard disks use metal platters with a thin coating of magnetic material.

Lacking any technical description of what the magnetic coating of a disk is made of, I decided to experiment. I had only the one bad hard disk, but I have hundreds of floppies lying around the office. Reasoning that a floppy's coating must be somewhat similar to a hard disk's, I began treating floppies with a variety of liquids I found around the house.

Sure enough, Coca-Cola did a great job of loosening the material, making it a murky, muddy mess that rubbed off easily with my fingers. (OK, I cheated here. I knew this from previous experience. We used to use Coke to dissolve small portions of audio tracks on news film when we needed to bleep something in a hurry.) After that I tried dishwashing detergent, grape juice, Formula 409, Turtle Wax, Drano (talk about dissolving power — it made a hole in the floppy!), motor oil, and dozens of other chemical combinations.

The winner, of all things, turned out to be Lemon Pledge. A careful application of this liquid gently rubbed onto a floppy not only gave it a nicely polished look and a fresh lemony scent but it also seemed to stiffen the floppy slightly.

Encouraged by my initial visual examination, I stuck the treated floppy into a spare disk drive and tried reading the contents. The files were still all there, and a quick check showed no bad sectors or other damage. Moreover, I noticed that I couldn't hear the disk spinning. Apparently the newly polished surface cut down on surface noise while the disk was being read. (The noise, by the way, doesn't come from the heads touching the surface. It generally comes from the disk portion rubbing against the inside of the plastic case, which contains a protective dust liner.)

With much anticipation, I opened up my crashed hard-disk drive and sprayed Lemon Pledge onto the top platter. Spinning the mechanism carefully, I eventually managed to buff the platter to a bright, reflective sheen. I plugged the drive into the computer and tried starting it up. To my surprise, my formerly deceased drive booted perfectly. The drive had been in the closet so long that it booted System 4.2! There were still some bad sectors on the disk, but then, I had treated only one of the drive's four platters.

And therein lay a problem: It was easy enough to treat the topmost, first platter, but what about the underside of that platter as well as the ones below it? If you know anything about hard drives, you know that these platters are packed together quite closely, and it's virtually impossible to take them apart without damaging either the platters or the head mechanism. Eventually, with the help of several tongue depressors; some old white cotton gloves; and that old standby, gaffer's tape, I managed to make a "robot" hand with very narrow fingers. I sprayed the contraption and then clamped it down gently as the drive was spinning. It took a while to accomplish, but eventually I'd completely treated the hard disk.

Not all the bad sectors could immediately be reused, which I'd suspected. If the disk error occurs outside a sector's data area (in the header information preceding each sector, for example), that sector will appear bad until you reformat the track it's on. So, with my fingers crossed and my lucky mouse cable wrapped around my forearm, I proceeded to erase and reformat the drive. A quick test showed *no* bad sectors! In a burst of daring, I tried copying files to it. Still no problems. A full analysis showed absolutely no lingering problems. I've been using the resurrected disk for several weeks with no complaints. Every day I run a sector tester on it to see if a bad sector has popped up, but so far none have.

By now you're probably shaking your head and thinking that I've joined the leagues of the lobotomized. But wait, there's more.

We go through thousands of floppy disks a month here at Macreations, and, inevitably, we encounter a dozen or so disks every month that fail to initialize. When this happens, we grab the disk, write a big X on the label, and chuck it into a box. When the box fills up, we send the disks to the manufacturer for replacement.

Having just resurrected a hard disk, I began to wonder about that box of unformattable disks. Might some of them be salvageable? Why not find out?

So I grabbed a disk out of the box, stuck it into my machine and tried formatting it. As I'd anticipated, it wouldn't verify and the Mac's formatting routines rejected it as unusable. Out came the Lemon Pledge. After ten minutes of polishing, I tried the disk again. Bang! It formatted with no complaints. By the end of the afternoon, I'd resurrected 12 out of 15 disks. (We'll just ignore the fact that I'd wasted several hours to get a dozen usable disks, when I could've simply sent them back and gotten new ones for free.)

Despite my success, something nagged at my subconscious. Formatting the treated

disks didn't seem to take as long as it usually did. Was I imagining things? Well, a simple explanation might go like this. The Mac's operating system tries to write information to a disk. When this operation fails, as it does occasionally, it tries again a few times (I think it's five times) before reporting this error to the user. If during one of these retries, the information is written without error, you'll never see an error message, because the Mac considers that it's completed the task successfully. Thus, theoretically, there could be as much as a fivefold difference in the time it takes to format two floppies, one being perfect and formatting without a single failure and the other being marginal and requiring five attempts before writing each piece of data to the disk.

To format an 800K floppy disk requires writing 80 tracks of information and 1,600 individual sectors. For a 1.4-megabyte disk, it's 2,800 sectors. In all that sector writing, it's not hard to imagine a random error or two creeping into the works every now and then. Statistics being what they are, most disks probably take about the same time to format. And because the Mac's operating system sets the number of retries so low, a marginal disk has a high likelihood of producing at least one sector write that produces more than five errors, so the disk fails to format.

That's the theory side of things. How about real life? Well, I couldn't test the formatting process, but I could create a small utility to test random writes to a disk. After several days, I'd devised a little utility that wrote to every sector of a floppy disk twice: once in sequential order, once in random order. I also hooked into the low-level operating-system routines so that each time the Mac tried to write to a disk, it bumped a counter in my program.

I expected a reasonably low number of errors, and that's what I saw. In the first ten disks I tried, I had error counts of 25, 21, 23, 25, 24, 19, 27, 18, 22, and 24 — that's out of 3,200 possible writes per disk. For the heck of it, I decided to treat these ten disks with Lemon Pledge and see what would happen. If Lemon Pledge was making it easier for the disk drive to do its job, these error numbers should go down significantly. But even I wasn't ready for the results: *not a single disk had any errors!*

I grabbed three disks that failed to verify their format and tried my little program on them. I got error counts of 157, 495, and 89. Out came the Lemon Pledge. I treated these disks and tried my little utility again. The second disk — the one that had the 495-error count — still looked pretty bad with 311 errors. But the other two disks had none.

Now comes the tough part — explaining just what Lemon Pledge does to disks. The polishing effect should not change anything, because the read/write heads of a disk drive do not actually touch the media. Lemon Pledge does contain ingredients that "pick up" dust, and dust, of course, is a no-no where disk drives are concerned. But does dusting a disk explain the dramatic results I found?

Could Lemon Pledge contain ingredients that enhance magnetic performance directly? (Indeed, is there such a thing?) The label on my can doesn't list any ingredients, although there is a helpful toll-free number, which I called. The representative, although polite, was at a loss to explain my results. She read me a list of ingredients, most of which are unpronounceable polysyllabic words meaning "oil-based gunk."

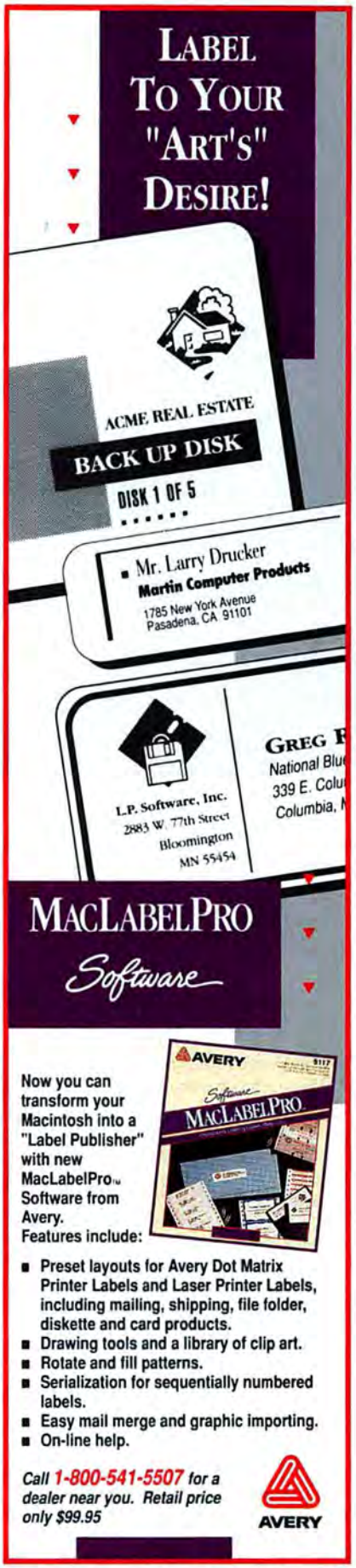
I read the list of ingredients to a friend who manufactures disks. He didn't recognize most of them but tentatively identified one as an ingredient he thought was used for some sort of cleaning process.

As a last resort, he suggested I consult a chemist fluent in molecular physics. He also wanted to know what combination of planet alignments had moved me to even try such a thing.

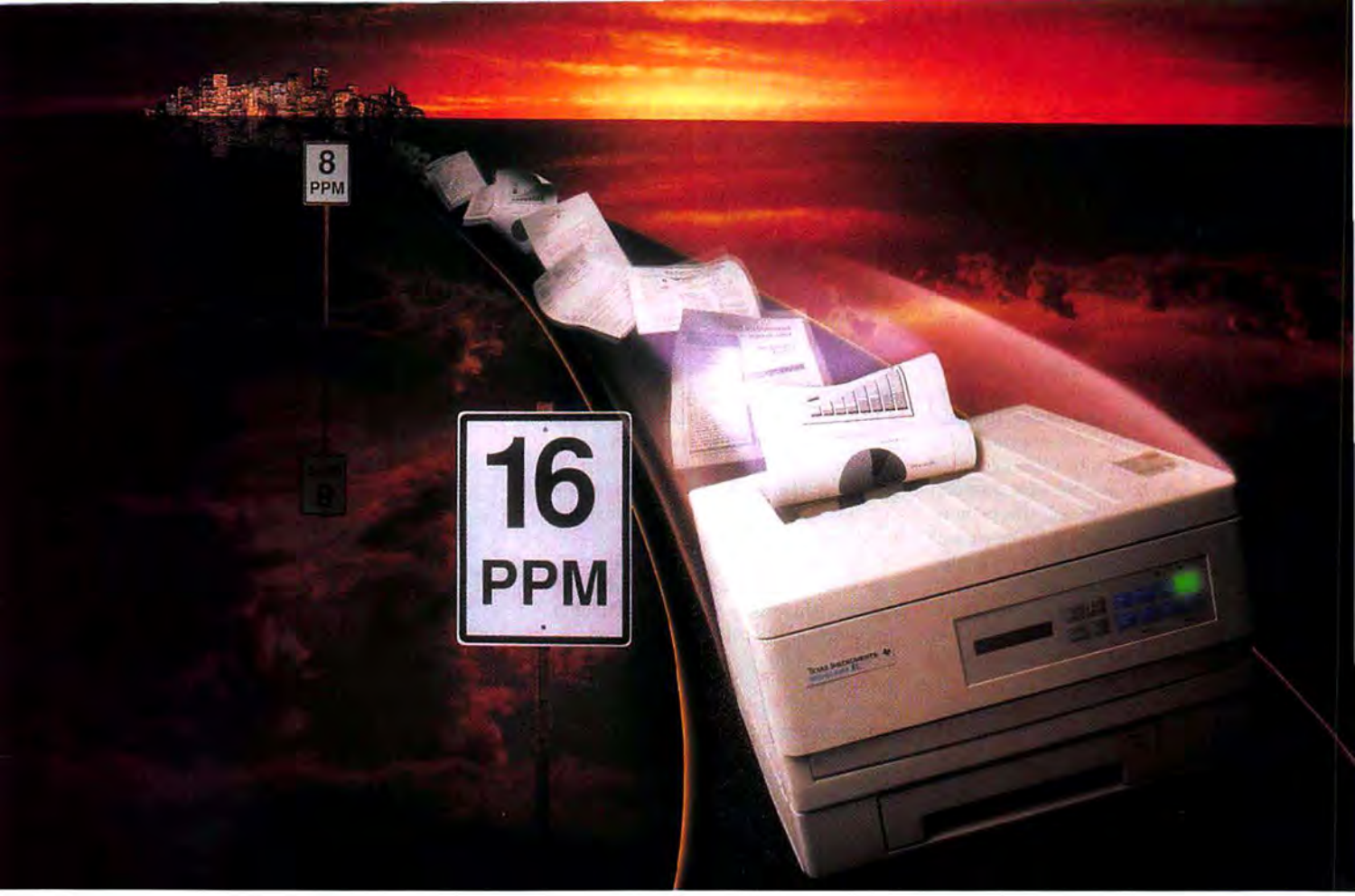
So the Lemon Pledge bit-fixing mystery will simply have to remain a mystery for now. And by the way, you shouldn't just rush right out and Lemon Pledge every disk in sight. All those audiophiles who've treated their CDs with Armor-All have gotten an unpleasant surprise after several months: The Armor-All treatment breaks down and leaves a flaky white residue on the CD, making it virtually unplayable. So, although the audiophiles believed that their treated CDs got marginally better sound, they also ended up having to buy new copies of the CDs after a couple of months.

Who knows what that Lemon Pledge is doing to the disk-drive heads? Is it possible that the effect will wear off right in the middle of a critical save? Who knows whether the treated disks will remain treated and usable and for how long? Heck, for all I know, all that Lemon Pledge I spilled onto my hands is going to cause skin cancer ten years down the line. In other words, folks, don't try this at home.

Besides, you should be wary of any advice that sounds too far out when you read it in the April issue.



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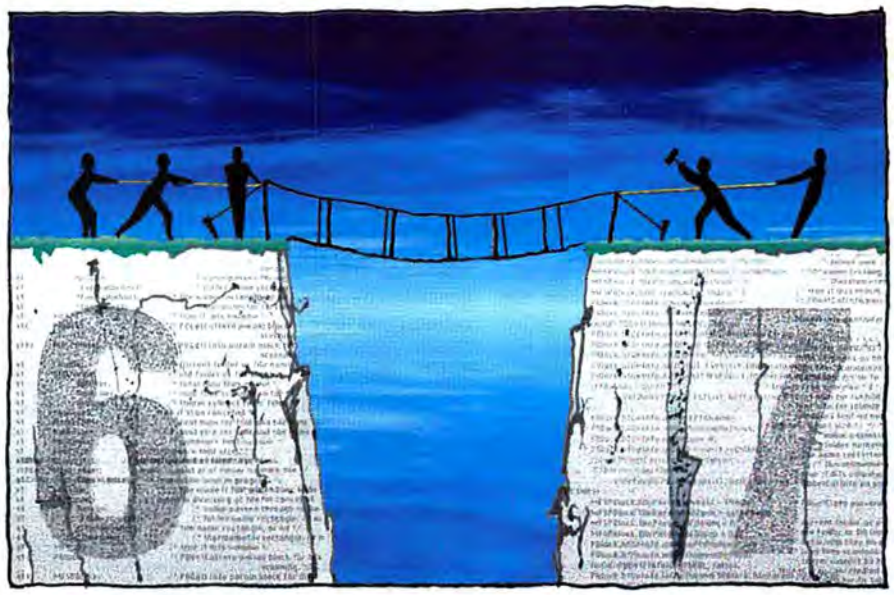
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7.0-Friendly Persuasion

While everyone else worries about compatibility with System 7.0, wouldn't you rather be exploiting its powerful new features in your applications? Here's how and why to write System 7.0-friendly code.

By Kurt W. G. Matthies and Thom Hogan



In Cupertino, Apple systems engineers have been laboring long into the night to bring you their latest and greatest: System 7.0, soon to be showing at a Mac near you.

System 7.0 will play to a captive audience. Although some Mac users will cling to the security of the tried-and-true System 6.0, those on the leading edge will use System 7.0 as their everyday operating system. And whether the pundits praise or pan the new System, developers will increase their market share by crafting applications for users of both versions. We explored this class of applications — those that are capable of running under System 6.0 and 7.0 — in last month's column.

This month, we take a look at two features exclusive to System 7.0 — outline fonts and high-level events.

Outline Fonts

One of the most visible changes in System 7.0 — outline fonts — involves the Font Manager. Outline fonts produce an effect similar to that produced by Adobe Type Manager. QuickDraw displays text drawn in an outline font, using the maximum available resolution of the output device, so outline fonts can be displayed at any point size without the jagged appearance typical of bit-mapped fonts.

Bit-mapped fonts, also called screen fonts, have been around since the Mac's inception. You're probably familiar with how they're organized. Bit-mapped fonts match the resolution of the screen (72 pixels per inch). Font designers carefully place each pixel for each character in a bit map and define these bit maps in multiple sizes, so when you use such fonts in a defined size, you get high-quality output. If you select a font size that's not defined in the bit map, the output appears jagged and distorted.

Font publishers ship as many point sizes as they think necessary for their users to do high-quality work. Thom, for example, ships his Palo Alto font in 9-, 10-, 12-, 14-, 18-, 24-, 36-, 48-, and 72-point sizes. The more point sizes a bit-mapped font contains, the more disk space it consumes. In the Palo Alto font, bit-map information for each character is repeated eight more times, once for each size of the font. The larger point sizes take up the most space: PaloAlto 10 (the file for the 10-point size of the Palo Alto font) is described in 2,420 bytes, whereas PaloAlto 72 uses 30,516 bytes.

Outline fonts take advantage of a classic issue in computer science: trading storage space for computational time. The gist of the space/time trade-off is: If you're willing to put in some computational effort, then you can generally reduce a program's storage requirements.

With outline fonts, the information kept for each character is not a bit map but is instead a description that the Font Manager uses to calculate each character's image. Font designers create a description for each character, called an outline, at a 1-point size. The Font Manager can create fonts of any point size from the 1-point outline, so only one representation per character is needed. This saves space: A typical outline font uses 40K. Not only do you get high-quality images at any font

size but also the font-size restriction of 127 points is lifted — a benefit for you banner printers.

Supporting Outline Fonts

Because System 7.0 implements outline-font support at the Font Manager layer, your application can take advantage of outline fonts without modification. But it's important to note that bit-mapped fonts have not gone away. System 7.0 supports bit-mapped as well as outline fonts, so in some situations, the system will contain both types of font for a particular family. In these cases, the system will default to the bit-mapped font. If you want to use the outline font, you must tell it to do so by calling **SetOutlinePreferred**, the new Font Manager routine that changes the default mode from Bit Mapped to Outline.

A word of warning: If you use the **SetOutlinePreferred** routine, your application must be running under System 7.0. System 6.0 doesn't have this call; calling **SetOutlinePreferred** under System 6.0 treats users to the notorious bomb box. In last month's column, we warned against making your application System 7.0-*dependent:* Always check the System version before issuing a call to System-dependent code.

Because the Font Manager produces high-quality outline-font images in any size, you'll need to add an Other item to your Font menu, if you don't already have one. The Other selection should produce a dialog box that provides your users with a way to enter any positive font-size value. Apple recommends, via its user-interface guidelines, that you also provide your users with a way to increment and decrement the font size. Two common keyboard equivalents for these actions are Command-+ (plus) and Command-– (minus).

An Eventful Release

Although outline fonts may provide the most visible evidence of software changes, the most extensive changes to the new System involve the event-processing subsection. The Event Manager is being revamped in System 7.0 to accommodate IAC (interapplication communication).

Rest assured: Your application will still receive an event whenever the user paws the keyboard or twiddles the mouse button — System 7.0 will not affect those fragments of your existing application's source code. But IAC brings a new kind of event — the high-level event — to the System's repertoire.

Table 1: AppleEvents Defined in System 7.0

Event	Action
Open application	Open an application
Open document	Open each specified document
Print	Print each specified document
Quit	Quit an application
Setup	Update the menu items
Get	Return a specific property

High-level events are a result of a multiple-application environment: They're generated by applications for other applications, and they form the basis of IAC. Communication occurs through these high-level events.

If you've had any experience with an MBOS (message-based operating system), such as RSX-11 or CTOS, then you should be familiar with the theory behind IAC on the Mac. In the vernacular of MBOS, a communication between two applications is called a message, and on the Macintosh, an application sends a message by posting a high-level event destined for another application running concurrently in the system.

Four terms — client, server, request, and response — form the basic vocabulary of MBOS. The application initiating a communication is called the client; the one targeted to receive the communication is called the server. Messages are classified into requests, which are initiated by the client, and responses, which the server posts in response to a request.

Receiving High-Level Events

Your application receives high-level events the same way it receives mouse-down or key-down events: in the main event loop. You probably recall that a Macintosh application receives events by calling **WaitNextEvent** in its main event loop (to jog your memory, see Power Programming, May '90, page 320). When **WaitNextEvent** returns a valid event record, the event code in the event record's **what** field identifies the event type. In System 7.0, the **what** field value equals 23 when the application receives a high-level event.

The Event Manager encodes information that identifies the message in the event record. The **message** field of the event record specifies the message class, and the **where** field contains the message ID. Both of these event-record fields are long integers, which the Event Manager uses to pass an **OSType** value, so message-class and ID values are similar application signatures. We expect that Apple will register message classes in the same way as it registers application signatures.

The message class defines the message origin. This uniquely identifies the sender of the message, so if your application's going to send messages, it's probably a good idea to use the application signature for this value. The message ID defines the type of message within its message class; we expect to see a range of these message-operation parameters in order to support the operations that each individual application is capable of.

Because of a high-level event's limited size, all the data associated with it may not be completely contained in the event record. If your application intends to process a high-level event, it should call the new Event Manager routine **AcceptHighLevelEvent**, which retrieves the extra data associated with the event.

How do you know what extra data, if any, will be sent along with the the high-level event? If IAC is to live up to its potential, it will require the cooperation of applications — and application developers. After all, if your application doesn't understand a message format, it can't take advantage of the data the message contains.

But don't look for a world in which message formats are shared freely among applications — at least not soon. Major software vendors will initially keep their message formats to themselves. To start with, IAC will consist of private transactions among a vendor's applications. The only message-format standards we'll see in the near future will be from Apple, and they're called AppleEvents.

AppleEvents

Apple will publish specifications for high-level events, called AppleEvents, in Volume VI of *Inside Macintosh*. Certified

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developers have had a peek at what these events tentatively will be; they're listed in Table 1.

Unfortunately, at this writing, we can't tell you anything else about AppleEvents and their format; we're still waiting for information about them. But you can do something now that will aid your effort to support AppleEvents. Apple calls it factoring your code.

Isolating User-Interface Code

The need to factor your code — that is, isolate those lines of code that manage the user interface from those that perform an action — arises from the way AppleEvents and the eventual command-line interface to the Finder will work.

The following example illustrates what we mean. When the System sends your application an open-document AppleEvent, it also sends a list of documents to open. Your application gets the list by calling `AcceptHighLevelEvent`. There's no need for your application to put up the `SFGetFile` dialog box to get file information from the user — the System sends the information that your application needs to open the files. You therefore don't want to have the call to `SFGetFile` (which puts up the open-file dialog box) in your application's file-open routine.

If your application is to support an AppleEvent interface, as we said earlier, you'll have to isolate the user-interface code from the action routine. The action routine is the code that actually performs the operation. In this example, it's the code that opens a document.

If you've been writing modular code all along, then you're probably already doing this. But if you have been calling user-interface code in the middle of your action routines, your work's cut out for you.

The open-document action procedure is particularly instructive, because chances are that your application already supports factoring. Most existing applications can open a document either from a File-menu selection or when the user double-clicks on the document's icon in the Finder. If you've written your open action routine to be called from either of these places in your code, you've already factored out the user-interface code.

You can begin factoring your code right now, even without the AppleEvents specifications. Factor out the Open, Print, and Save action routines. When the spec is available, just plug in the code that parses the message data, and you're off and running in System 7.0.

Note that we recommend that you factor out your Save action procedure, even though Apple hasn't hinted that System 7.0 will require it.

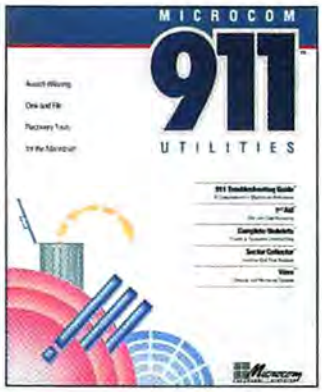
Factoring is a logical result of modular programming and leads to the best way to implement Undo/Redo in your application. All the action routines in our commercial application, Tycho Table Maker, are factored. The input to Tycho's action routines is a parameter block, which can be built from the user-interface subsection or from the redo subsection. But that's the topic for another column

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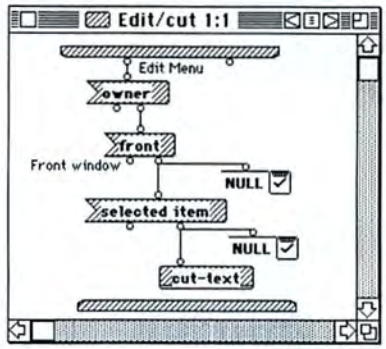
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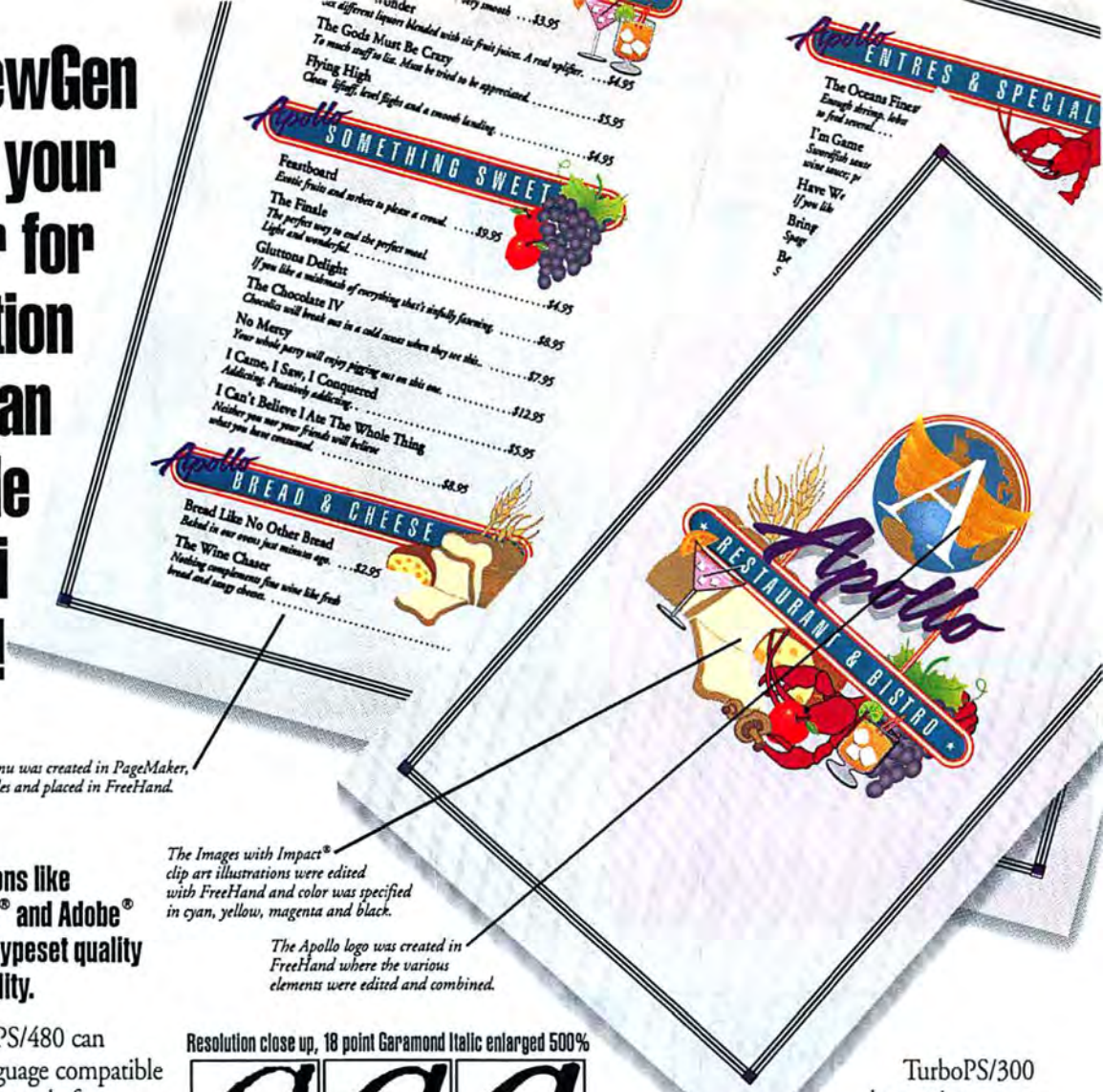
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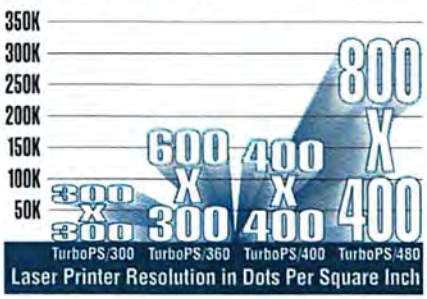
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Compiled by Gregory Wasson

QuarkXPress 3.0

QuarkXPress 3.0's in-line-graphics and paragraph-rule capabilities give you an easy way to create real fractions (placed top over bottom, not diagonally as in the QuarkFreebies extensions). In-line-text boxes are simple to manipulate.

First create your standard text, leaving markers where you want the fractions to be. Then create a new text box on the pasteboard, making sure that the text inset for this box is set to 0. Create a fraction by typing the numerator, pressing Return, and then typing the denominator. The point size of the fraction should be 1 to 3 points smaller than the body text. Set the alignment to center.

Highlight the first line, and create a paragraph rule (using the Style menu). A hairline rule based on the indents works well with numbers greater than 9, but you can use the text setting for fractions that contain only a single digit top and bottom.

Make sure the text box is as small as possible without losing any type, and then click on the text box with the item-selector tool and copy it. Using the editing tool, paste this box into the body text where you want the fraction to be. Use the Baseline Shift command in negative increments to bring the fraction down to the level you like. Use the kerning command on the Measurements palette to adjust the word spacing.

For small body text, you may find that the in-line text box has too much white space to the right and that even kerning does not help. The only solution is to use the text box as a free-floating graphic. Just make sure that if you edit the body text, you also reposition the fractions, if necessary.

Once you've created a fraction this way, you can create others by copying and pasting the original fraction into new positions and changing the numbers.

David Zizza
North Billerica, MA

If you've ever wanted to create a word with a large initial letter and the other letters nested inside it, you can do it in QuarkXPress 3.0. The following steps will help you recreate the effect illustrated in Figure 1:

1. Type the first letter (*C* in the example) in a large font size.

2. Type the rest of the word (in this case, *ats*)

Tip of the Month

File Recovery

Can file-recovery programs such as Complete Undelete or Norton Utilities' UnErase really get all your deleted files back? If you use one of these file-recovery programs, you may be in for a surprise when you try to recover some deleted files. You might not be as protected as you think if you use MultiFinder and always print with background printing on or if you often use such programs as FileMaker Pro or Microsoft Word.

Background printing spools a temporary file that contains your print job. After the job has been printed, the file is automatically deleted, transparently to the user. However, some programs create a temporary copy of the file you are working on and delete the copy when you quit. Your file-recovery program sees these deleted files as normal documents that you've trashed. Therefore your list of recoverable files may be filled with a bunch of "Spool File 1" or "Word Temp 4" documents and very few real documents that you have actually erased (see Figure A).

To maximize your protection, you should allocate the largest amount of space that your file-recovery program allows for keeping track of deleted files. This way you have a better chance of finding the old budget forecast that you deleted last week and that your boss suddenly wants. The small amount of disk space you give up for the recovery program may be well worth it when you are in dire need of some old data.

Chris Catalano
Farmingville, NY

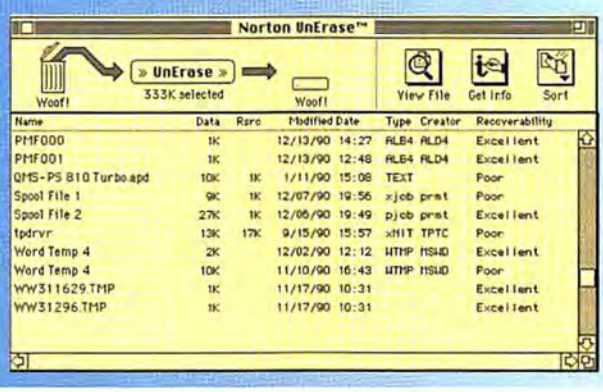


Figure A: Utilities that "undelete" trashed files, such as Complete Undelete or Norton Utilities' UnErase, can become clogged by temporary files in your System Folder, reducing your protection.

in a smaller point size.

3. Select the *ats*, and move the baseline up until it is in the middle of the opening of the *C*.

4. Select the *C* and the *ats*, and modify the tracking until the *ats* is nested inside the *C*.

5. Select the *ats*, and reset the tracking to 0.

Although you can achieve the same effect by using two text boxes and placing one inside the other, this method is easier, because you don't have to worry about grouping text boxes or making boxes transparent. It's also a lot easier to rearrange and copy.

Alan Sopczak
Calgary, Alberta
Canada

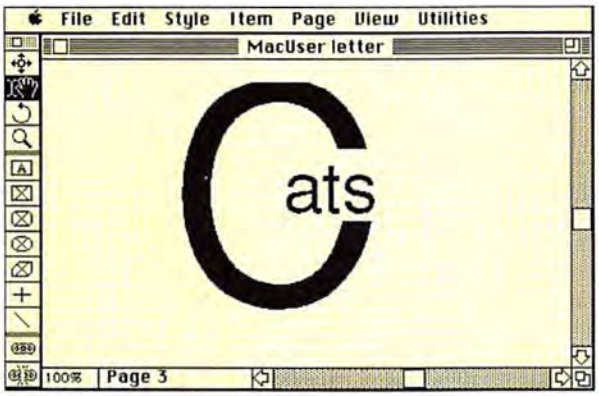


Figure 1: QuarkXPress' tracking controls let you create snazzy type effects such as nesting letters of a word inside an oversized initial letter.

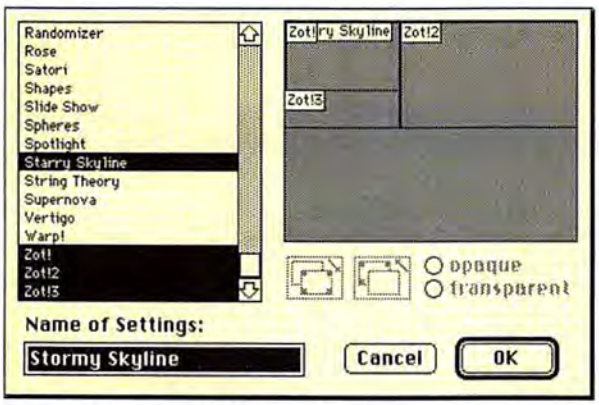


Figure 2: After Dark 2.0's MultiModule lets you create your own modules without programming.

Tip from the Experts

Word 4.0

Last month's Tip Sheet told you how to place a box around inline text in a Word 4.0 document by converting the text to a graphic (with Command-Option-D) and then applying the Outline style to it.

Microsoft has suggested an easier solution — using Word's Box typesetting formula instead. This allows the text to remain fully editable in case revisions are necessary. Here's how to do it:

1. Make sure Show Paragraphs is turned off via the Edit menu (or Command-Y).

2. Place your cursor before the text to be boxed, and press Command-Option-\. Type X and an opening parenthesis.

3. Move the insertion point to the end of the text and type the closing parenthesis.

4. Go back to the Edit menu, and turn Show Paragraphs back on. There you have it: boxed, fully editable text.

PageMaker 4.0

In order to set professional-looking fractions in PageMaker 4.0, change the option for subscript position (on the Type menu) from 33.33 percent to 0 percent. To set a fraction, all you need do is type in the numbers and change the numerator to superscript and the denominator to subscript. No more calculating and changing the size of your denominator — it will be perfect every time.

Margaret Lund
Appleton, WI

After Dark 2.0

Even After Dark 2.0's extensive collection of modules can fail to stimulate after a while. But the screen saver's MultiModule allows an amazing amount of customization without your having any programming knowledge whatsoever. One of my favorites is Stormy Skyline. To turn Stormy Skyline into one hell of an electrical storm (see Figure 2), simply follow these instructions:

1. Duplicate the Zot! module twice while you're at the desktop, renaming the copies Zot!2 and Zot!3.

2. Open the MultiModule to Stormy Skyline (a predefined combination of Starry Skyline and Zot!), and click on the Edit button. Add Zot!2 and Zot!3 to this MultiModule, making them transparent instead of opaque. You should now have all three of the Zot! modules and the Starry Skyline module combined.

3. Resize and reposition the Zot!s — it looks better to have them different sizes.

4. Close the edited MultiModule, but first rename it something like Really Stormy Skyline.

5. Open the individual Zot! modules, and edit the forkiness, kinkiness, and delay of each.

David D. Good
Melbourne Beach, FL

Apple Installer

When using Apple's Installer under MultiFinder to create startup disks, you normally have to put up with a lot of disk swapping — especially if you're working from a hard disk and your system has only one floppy drive. You can reduce the number of disk swaps by increasing the amount of memory allocated to the Installer program, so that each of the four System disks needs to be inserted only once to obtain the necessary information. Here's what to do:

Select the Installer icon, and choose Get Info from the File menu (or press Command-I). Increase the amount of memory allocated to the Installer in the Application Memory Size box. Give the Installer at least 1 megabyte of RAM to work with.

Using the same method, you can increase the amount of memory allocated to Font/DA Mover. This will reduce the number of system crashes when you're copying or deleting large font or DA files.

Ward Barnett
Minnetonka, MN

HyperCard

I finally got tired of typing `set userlevel to 6` and `set userlevel to 2` when developing applications in HyperTalk. So I wrote the following and put it into my Home-stack script:

```
on u x
  set userlevel to
param(1)
end u
```

Now I just type `u 6` or `u 1` in the message box.

Paul Clatworthy
Redondo Beach, CA

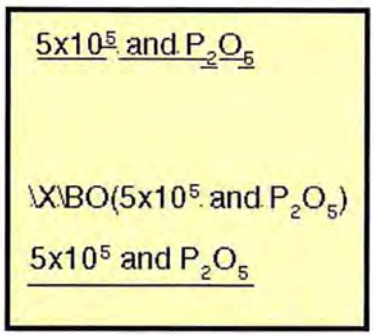


Figure 3: Word's typesetting formulas offer a better way to underline equations containing subscripts or superscripts (bottom) than using the Underline style (top).

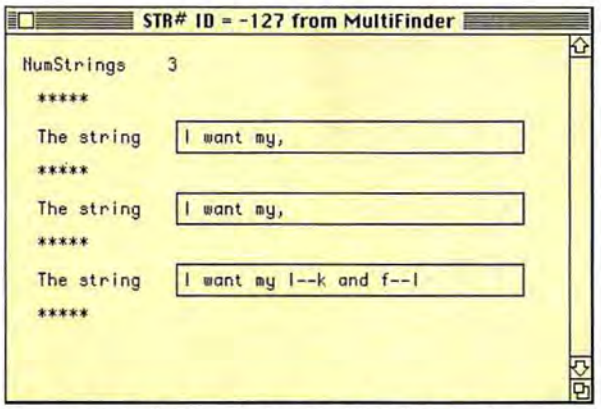


Figure 4: Ah, for that Mac "!—k and f—!" MultiFinder gives up its secrets to ResEdit.

Word 4.0

Underlining equations with subscripts or superscripts can be hard in Word 4.0. The underline style (Command-Shift-U) places separate underlines under the subscripted or superscripted numbers. Here's how to get a solid underline under equations, whether the format is displayed or in-line:

1. Choose the Show Paragraph command from the Edit menu (or type Command-Y).

2. Press Command-Option-\. This is the preparatory command for doing mathematical typesetting.

3. Enter the letter-typesetting code — in this case, X (for the Box command).

4. Press Command-Option-\ again, followed by BO for the bottom border of the box.

5. Type in the arguments, and enclose them in parentheses. Apply superscript and subscript formatting where necessary.

6. To view the formula, select Hide Paragraphs. Word's typesetting code draws a solid line under the equation and won't interfere with the rest of the paragraph's formatting (see Figure 3).

David J. Siegel
Northridge, CA

MultiFinder 6.0x

Ever wondered what kind of people programmed your Mac? If you're running MultiFinder 1.0, hold down Control-Option-Command and select About MultiFinder from the Apple menu. Alas, in more recent versions, this humorous box seems to have been removed. But don't despair, the Mac spirit lives on! For an example, use ResEdit to examine STR# ID = -127 in MultiFinder 6.0.x (see Figure 4).

Peter Maloney
Toronto, Ontario
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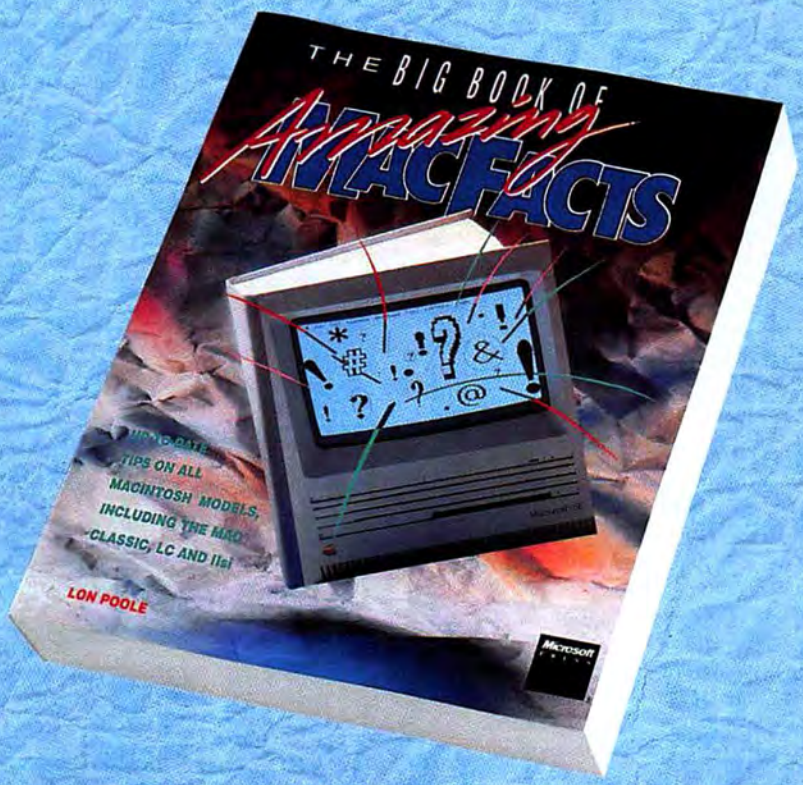
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Questions, anyone? Here's where to get answers from the experts. Bob LeVitus is the author of the best-selling Dr. Macintosh. *Andy Ihnatko isn't. But he knows a lot about the Mac, and he's got a heck of an attitude. Together, they're ready to answer your questions about everything Macintosh.*

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Don't want to wait for an answer? Post your question on Zmac, MacUser's *on-line service, and get a reply from Bob, Andy, or one of the other* MacUser *experts. See the masthead in this issue for instructions on how to sign up.*

By Bob LeVitus and Andy Ihnatko

Word Memo Magic

Q. Some years ago, I watched a colleague do something with Microsoft Word that no one at either my local user group or at Microsoft tech support has been able to duplicate. He selected an item named Memo Template from the Work menu, and after working through a series of dialog boxes (asking who the memo's from, whom it goes to, the date, subject, and so on)—hey, presto!, he had a customized memo ready to go.

Can you offer any guidance on how to duplicate this? Maybe the computer consultant who adapted my colleague's Word program knows something we don't.

F. Gary Bivings
Washington, DC

Andy: I'm faced with two options here, F. Either I admit defeat and say I dunno how the Zarquon he did it, or I can claim that the computer consultant made some wacky, illegal modifications to Word (I'm sure that if you give the miscreant's name to Microsoft, they'll send you a free T-shirt or something).

No, but seriously, you can duplicate 99.44 percent of your colleague's memo template pretty simply. Believe it or not, Word actually has a built-in mechanism for generating dialog boxes and collecting data from users! It's called the ASK command, and it's part of Word's Print Merge feature. The command goes like this:

«ASK fieldname=?Message to be shown in dialog box».

So let's get to work. Create a memo template the same way you'd create a mail-merge document, with field names (**«RECIPIENT»**, **«REGARDING»**, and the like) representing the stuff that'll change from memo to memo. Then at the beginning of the document, just write an **ASK** statement for each field, viz: **«ASK RECIPIENT=?So who's this going to, Doc?»** (see Figure 1).

And that's all there is to it. To generate a memo, open the template, select Print Merge, and click on the New Document button in the Print Merge dialog box. Word then throws dialog boxes onto the screen, asking for the info for each field and merging it into the new memo document. Move the memo template into the Work menu, and you've duplicated 90 percent of the Evil Consultant's magic-memo trick.

For the remaining 9 and $^{44}/_{100}$, we have to get the Print Merge dialog box and the associated dialog boxes to come up after selection of the template without a manually entered Merge command and whatnot. We can, of course, do this very easily with a macro (Microsoft Word includes a macro maker).

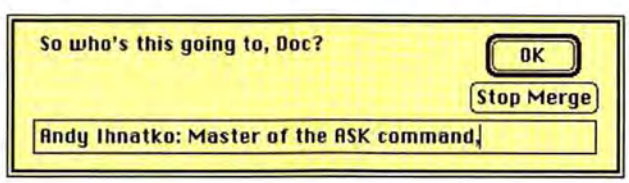


Figure 1: Go ahead and customize those memos: Dialog boxes using the ASK command in Microsoft Word's Print Merge function make it easy.

*. . . But Were Afraid to Ask

Got a question that's so simple you're embarrassed even to ask? The only stupid questions are the questions you don't ask, so send 'em in! If you think it's too embarrassing, we'll say it was written by a deceased English poet laureate, so hop to it!

Q. Is there any real difference between the printer port and the modem port? I want to add a second printer to my Mac and thought I could just plug the second printer into the modem port, but my dealer says it won't work and I'll have to buy LocalTalk. Is he just trying to sell me a bunch of hardware I don't need? Will I burn out the modem port?

Versificator Regis (1216 – 1272)
Palos Verde, CA

Andy: Well, Versificator, if you're reading this in your dealer's store, run. Dive for the car and peel out of there in a spray of gravel, because your dealer is dead wrong.

Simple answer first. The only difference between the two ports is that the modem port does not support LocalTalk. You can go nuts and plug a modem into the printer port and vice versa. The only catch is that your software will expect modems and printers to be attached to their proper connectors, so you'll probably have to change the default settings for the software you're using (use the Chooser for printers and your communications software for modems). Lots of folks use the printer port for LocalTalk and have an ImageWriter hooked up to the modem port. That way, they can print draft copies without having to queue up to use the office LaserWriter.

In the Pursuit of Truth, I have to tell you that the two ports ain't exactly *identical*, at least not in the sense that the Landers-Van Buren sisters are identical; the modem port has a few things that make it more suitable for telecommunications than the printer port. This doesn't mean that you can't — or shouldn't — use a modem with the printer port. This is America, and subject to state legislation, you can put your modem wherever you want.

Um . . . well, I've been working at this problem for almost four hours now, and I have to admit that I'm stumped. Calling a macro from within a Word menu command appears to be impossible. But because this is America, we're allowed to fake it. Instead of trying to make Word call a macro, have a macro call Word. Just record a macro that selects the template from the Work menu and performs the merge commands.

Bob: I've been using Word for years but even *I* didn't know you could do that! Very cool, Andy. Of course, it's in the Word manual, under "Form Letters." Why didn't I think of that . . . ?

Andy: It just goes to prove that it's very important to read the manual, even though it really makes you look like a wimp in front of the other guys and of course you'd never catch *me* doing it.

Logging Mac Use

Q. Help! I need a program that automatically logs my activities on the Mac. I want something that will prompt users for a name each time the Mac is booted and then keep track of the programs or folders that are opened (logging the date, time, length of use, and user name). After searching for six months, I found a shareware program called LaunchInit 2.0, but I can't get it to work on my Mac Plus. Can you help me?

Bryon Beaulieu
Winston, OR

Bob: I downloaded a copy of LaunchInit 2.0 and played with it for a while. It seems to do exactly what you're asking, and it runs fine on my Mac. The documentation is not exactly clear, however, so here's a quick tutorial. Launch the INIT by double-clicking on it while holding down the Command and Option keys. When the Configuration dialog box appears, make sure to check the Enter at Startup option under User Name and then save. Because this is an INIT, you need to drop LaunchInit into your System Folder and restart your Mac to activate it.

If for some reason, it still doesn't work, consider Softview's commercial product MacInUse. It should do everything you need and sells for about $99.

Andy: I'd never heard of LaunchInit before you guys started talking about it. I've since loaded it on my 2.5-megabyte Plus, and I can verify that it works like a charm.

How Much RAM?

Q. I have a Mac Plus with 2.5 megabytes of RAM. However, my DiskTop DA seems to be unable to recognize the amount of memory I'm using when I run under MultiFinder. As you can see by the attached screen dump (see Figure 2), DiskTop says I have 29K out of 324K free, but About the Macintosh Finder says that I have 2,560K of total memory and an unused block of 1,530K. What gives?

Jerry O'Neil
Polaski, NY

Andy: Before we go any further, I should say, in Jerry's defense, that the screen shot actually came from *my* system, not his! Now that we've got that out of the way, the discrepancy you've noticed has to do with the way MultiFinder handles DAs. When you're using the regular Finder, you have one application sitting in a 2.5-megabyte "box" of memory (well, OK, I'm simplifying things here. It's really 2.5 megabytes *minus* your INITs, the System file, and a whole lot of other things). When you open a DA, the System throws that DA into the same box as the application, memory permitting.

Under MultiFinder, however, the 2.5-megabyte memory box gets chopped up into a lot of little boxes — one for each program being run. This keeps memory nice and tidy — Microsoft Word stays in its 1-megabyte box and doesn't ooze into Tetris' 512K playpen. But what happens when you open a DA? Should MultiFinder steal some memory from Microsoft Word and throw the DA into its own box o' memory?

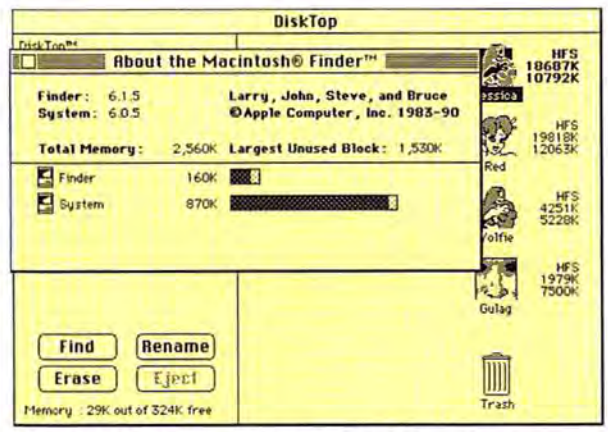


Figure 2: Under MultiFinder, DiskTop (and all other DAs) are normally given 324K of memory to play with. But if you want to know how much memory you really have available, look at the bars in About the Macintosh Finder.

No, no, that wouldn't do at all. Instead, MultiFinder gives *all* the DAs a 324K memory box of their own. So when you ask DiskTop how much memory it can "see," it looks at the size of its box and figures that you have a total of 324K of memory.

You're certain to get a correct memory reading when you ask the Finder. The Finder is God. It sees all and knows all. In fact, those bars you see in the About the Macintosh Finder dialog box represent the programs currently in memory and the size of their boxes.

Bob: And speaking of more memory, here's a tip on getting recalcitrant DAs to work when the 324K that MultiFinder allocates them just isn't enough. To apply this tip, you must first allocate additional memory to the application (the tip also works with the Finder) that you plan to use when you access the memory-hungry DA. To do this, select the application's or the Finder's icon and then choose Get Info from the File menu (or type Command-I). Type a number that's at least 325K larger than the suggested memory size into the little box that says Application Memory Size (K). Once you've done that, launch the application and then hold down the Option key when you select your greedy DA from the Apple menu. Instead of loading into MultiFinder's DA Handler, the DA now loads into the "memory box," as Andy refers to it, for the application. Because you have allocated additional memory to the application, the DA has more room to do its thing than if you had chosen it without holding down the Option key.

Plus Obsolete?

Q. Now that all the new Macs are on the market, I wonder what will happen to all of us "old"-Mac owners. Two weeks before the Classic was introduced, I bought a Mac Plus, an HP DeskWriter, and a 45-megabyte hard-disk drive for around $2,100 (I was unable to resist such a great price on the world's finest computer).

I am incredibly happy with my purchases, but I'm wondering if I made a bad decision. How many Mac Pluses have been sold, and now that the Plus has been discontinued,

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will software developers stop supporting it or will new software developed for the Classic be compatible with the Plus?

My last question: Has *MacUser* ever done a comparison of full-page monitors?

Paul Croteau
Denton, TX

Bob: It sounds as though you got a pretty good deal — a Plus, a printer, and a hard drive for less than I paid for a Mac Plus with no hard drive or printer in 1986. I don't know how many Mac Pluses have been sold, but I don't think you have to worry about old-Mac owners being abandoned, at least not in the near future. The Classic, SE, and Plus all use the 8-megahertz 68000 chip as their CPU. I'd guess that machines with this processor make up more than 50 percent of the Macs now in use, so you can pretty much rest assured that there will be plenty of new software for your Plus and that developers will continue to support the Plus (and the SE) long into the future.

Finally, MacUser Labs reported on full-page displays a couple of months ago (see "Picture-Perfect Portraits: Full-Page Displays," February '91, page 176).

Andy: I guess it's Plus Pride Month! You won't regret your purchase, Paul. A few of the Classic's major improvements over the Plus: The logic board is about half the size of the Plus' and has a more efficient design; instead of the old 800K disk drive, there's a 1.4-megabyte SuperDrive; there's a standard ADB port instead of the old phone-cord keyboard cable; and the notoriously wonky Plus power supply has been taken out and shot and replaced with a nice, stable, fan-cooled unit.

As you might guess, most software out there couldn't care less about all that stuff, so you shouldn't have many problems. Frankly, I'm hard-pressed to think of *any* software that would run on a Classic but not on a similarly equipped Plus. The Classic has four times the ROM capacity of the Plus, but 358K is taken up by "diskless server" code that (hypothetically) lets the Classic connect to and use AppleShare file servers without any additional software. This leaves only a 26K discrepancy, the exact size of the freeware game Duck Hunt. Coincidence? Maybe.

There are *some* hazards involved in owning a Plus, however. There's the possibility that one day Apple will run out of replacement Plus components (especially power supplies!), and then we won't be able to get our machines repaired. I don't think that's a cause for concern; after all, you can still go somewhere to get an eight-year-old Lisa fixed, so I wouldn't be too worried about the Plus. Then there's the threat that eventually The Industry will abandon 800K disks and ship software exclusively on 1.4-megabyte floppies. If it happens (and I don't think it will for another few years yet), you'll just have to blow $300 on an external 1.4-megabyte drive — that's all.

The final hazard is the scorn and derision of cloth-eared louts with 24-bit-color IIfx systems. Just remember that (a) whatever doesn't kill you makes you stronger and (b) according to current U.S. Postal Service regulations, it's not illegal to mail, to a domestic addressee, a package containing rotting fish parts.

Trashing INITs

Q. I have a Mac Plus with a 45-megabyte hard-disk drive. After loading SuperLaserSpool, I was surprised to see how much memory it required and decided to remove it from my System Folder. I tried to drag it into the trash but was told that the application was locked or busy and that the trash couldn't be emptied. I tried holding down the Option key while dragging the file to the trash, which should have done the job, but I got the same message. Eventually, after many attempts and different combinations of trashing and rebooting, I was able to get rid of the file, but I had to completely power down twice before the file would leave me alone.

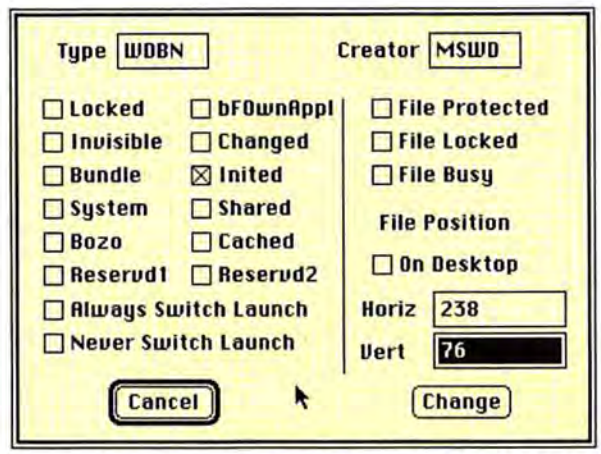


Figure 3: A whole wheelbarrowful of attributes, huh? SUM 2.0 lets you edit a file's attributes so that (among other things) you can trash it more easily.

The same thing happened later that day when I installed Adobe Type Manager. Basically, I'm confused. I have only a few INITs and only one System Folder (as prescribed by Dr. Macintosh!), so I can see no reason for this problem.

Paul Croteau
Denton, TX

Bob: You again, Paul? Well, because you're new to the Mac and this is a good question, we'll answer this one too. The problem is that the INITs (SuperLaserSpool and Adobe Type Manager) really were busy. If an INIT is in the System Folder at startup time, it will be activated. Many INITs, such as the two you've had your problem with, cannot be removed while they're active.

There are several ways you could have deactivated them and then trashed them. The easiest is to boot from a floppy disk with a System Folder on it and then drag the INIT from the System Folder on your hard disk to the trash. Another way is to use an INIT manager, such as InitPicker or Aask. Turn the INIT off, reboot, and then drag it into the trash. Finally, you can move the INIT out of your System Folder and onto the desktop (or into another folder) and restart your Macintosh. Because an INIT won't activate unless it's in your System Folder at boot time, you can then trash it without any problem.

Andy: Just remember, Paul, within any one Help Folder, only the first two answers are free of charge. One more question, and we'll have to start charging you.

More Problems Trashing Files

Q. I'm having a problem trying to move and trash a couple of files. When I try to move them or to send them to the Great Trash Icon in the Corner, the following alert comes up: "Cannot be duplicated or moved."

I have tried the lock and unlock routines to no avail. How can I trash these two rascals?

William R. Gallagher
Mogadore, OH

Andy: I suggest you contact your local user group and ask for *Apple Technical Note #482:* "Stuff We Put in Just to Make Life Hard for Our Users." When a file won't budge, it's

usually because its File Protected or File Busy flag has been checked. (File Protected means that the file cannot be copied or deleted; File Busy means it's currently being used by some application, such as MultiFinder or AppleShare.) To change a file's attributes, you need a program such as SUM, DiskTop, or ResEdit 2.0. Figure 3 shows what SUM's Edit File Attributes dialog box looks like.

If the File Protected or the File Busy flag is set, try turning it off (after you've made a note of which attributes were turned on before you started monkeying around). A document generally has just its Inited flag set; an application usually has its Inited and its Bundle bits set. Use a little caution at first; maybe another application really *is* using that file, and trashing it could ruin your whole day. For safety's sake, turn off MultiFinder and remove the Mac from any file-sharing networks.

Still can't trash the file? Maybe there's an INIT that's struggling to keep the file open, such as Suitcase II or a networking INIT. Disable all your INITs, and try again.

I should mention that all of the above is hardly a polite way to interact with your Mac. Ideally, file attributes should be modified only by the System, the Finder, and other programs that know what they're doing; that way, if something gets terminally screwed up, it won't be your fault and you'll have somebody to sue.

If you'd like to learn more about what exactly all those file attributes do, your best bet is probably to pound your head against a wall over and over again until the desire passes.

Transferring Fonts from PCs to Macs

Q. Friends with PCs have modems and I don't, so in my ignorance I have to ask: Can font files (including the resource forks) be received by PCs and then successfully transferred via TOPS to a Mac?

Name and address withheld

Andy: In today's society of technological brotherhood and unity, anything's possible, Name and. Downloading a Mac file from a bulletin board to a PC is a piece of cake, and TOPSing the downloaded files from the PC to your Mac is as easy as pie.

It'd all be so perfect if it weren't for the fact that none of the files will actually be usable. All the downloaded files — fonts, applications, graphics files, whatever — will appear on the Mac desktop as generic documents, and any attempts to open the docs will result in the Mac's ever-so-helpful "Application busy or missing" error message.

The problem lies in how a Mac file is stored on-disk. As you mentioned, a Mac file (be it a document, an application, or whatever) actually consists of two separate forks: a resource fork and a data fork. (You can think of them as two subfiles if it'll help; we programmers just like to work the word *fork* into polite conversation whenever we get the opportunity.) The resource fork contains Mac resources, such as actual program code, prefab icons, windows, menus, sounds, little snippets of text, and the like. The data fork — and this is a direct quote from an official Apple glossary — "Contains non-resource information." Thanks, guys! So, as an example, if you examine an application that prints a 20-page user manual when run, you'll probably find its menus, windows, icons, and the actual code itself in the resource fork and the 20 pages of text in the data fork. (OK, OK, that was kind of a long diversion, but was it all that much trouble to read?)

This is a perfectly spiffy way of storing data, but it's unique to the Mac. Almost all other computers store their files in one big, wobbly mound of data, and this causes problems. Somehow the Mac's two forks have to be crammed together before the file can be put onto a PC.

Fortunately, those Apple guys think of everything. We have a solution in the form of the MacBinary protocol, used by the vast majority of Macintosh communications software. It's nothing more than a standardized fork-cramming scheme. When a Mac file is electronically sent somewhere, the MacBinary protocol merges its two forks into one stream of data and puts a "header" at the top of the file. When a Mac receives a MacBinary-encoded file, it uses the information supplied in the header to separate the data back into its original two-fork format.

Finally, we get to the meat of the matter: IBM PCs don't support MacBinary, and neither does TOPS. This means that the crammed-together file isn't restored when the PC downloads it, and it isn't restored when TOPS moves it to your Mac. But fret not, you can fix the file yourself, with a shareware Apple File Exchange translator called MacBinary to Mac (available on Zmac and from other shareware sources). This translator can read the MacBinary header and turn that generic document into a double-clickable application; a working font file; or if you're lucky, a 256-color PICT of Kim Basinger.

By the way, you get the same problems when you download a Mac file to a DOS disk and then use your Mac's SuperDrive to try to read the file. You'll be able to copy the file to your hard drive, but you'll need to use a MacBinary translator before you can use the file.

Bob (who was recently quoted in the *New York Times* as saying, "Touching a PC makes me feel crawly inside"): I don't do DOS. I'll defer to Andy on this.

Environmental Shipping

Q. Most manufacturers ship their products with anti-environmental products, such as Styrofoam and plastic. Suppose these same manufacturers offered prepaid return postage on the box with the foam molds so that they could reuse them? I wouldn't mind getting an old box as long as I got a new product.

Chuck Watkins

Chelsea, AL

Andy: Sounds like a good idea to me, Chuck. Why not write a few letters to your favorite companies and suggest it? One by one, corporations are realizing that becoming environmentally aware isn't just hip, it's profitable. If enough folks write in asking for environmentally studly packaging, we're sure to see a real change.

But until the industrial complex knuckles under, why not recycle that stuff yourself? The environment aside, it's a good idea to hold on to all the packing material your hardware came in, because you may need to ship the unit back to the manufacturer for service one day, and many companies actually demand that you ship it in its original packing. Plus, that custom packing is the next-safest thing to a hard-shell case. Believe it or not, I once checked my Mac Plus (in its original box) on an airline flight as luggage and it came through without a scratch (the Mac, not the box).

As for those packing peanuts and whatnot, toss 'em in a bag. There'll be one less thing for baby seals to munch on, and you'll always be prepared when you have to send off a package.

Bob: I try to do business only with companies that are, as Andy so eloquently puts it, "environmentally studly." A tip of the hat to mail-order vendors such as MacConnection

Go With The Winners!

The votes have been counted and *MacUser* editors have chosen these Macintosh products as the best of the best in their categories.*

Congratulations to the companies who have put considerable time and effort and forethought into raising the standards of excellence for Macintosh products. So go with the winners– the 1990 Eddy Award winners!



Congratulations To The 1990 Eddy Award Winners

Global Village Communication Teleport A300



Best Communications Product

The first ADB-compatible personal modem for the Macintosh
Teleport A300 DP#137301
Sugg. Ret. $225

Graphsoft MiniCad+ 3.0



Best CAD Software

A competitively priced, 2-D CAD system with project-cost spreadsheet
MiniCad+ 3.0 DP#191202
Sugg. Ret. $695

Symantec THINK Pascal 3.0



Best Development Tool

Provides extensive support for object-oriented programming
THINK Pascal 3.0
DP#352128
Sugg. Ret. $249

Timeworks Publish It! Easy 2.0



Best Page-Design Program

The all-in-one desktop publishing program Publish It!
Easy 2.0 DP#377021
Sugg. Ret. $249.95

Dynaware DynaPerspective 2.0



Best Modeling/Rendering Package

Brings new perspective to 3-D modeling
DynaPerspective 2.0
DP#165204
Sugg. Ret. $995

Symantec Norton Utilities 1.0



Best Utility

An ideal combination of data recovery and disk utilities
Norton Utilities 1.0
DP#299050
Sugg. Ret. $129

Brøderbund TypeStyler 1.5



Best Typographic Program

An amazing range of effects lets users put their best font forward
TypeStyler 1.5 DP#121178
Sugg. Ret. $199.95

Paracomp FilmMaker 1.0



Best Animation Program

Powerful animation and presentation program with dramatic special effects
FilmMaker 1.0 DP#290516
Sugg. Ret. $695

Digidesign Deck



Best Music Product (Two Awards)

Multitrack digital recording with auto-mixing and MIDI playback
Deck DP#177204
Sugg. Ret. $349

Symantec MORE 3.0



Best Presentation Product

Creates presentations and documents quickly and easily
MORE 3.0 DP#352116
Sugg. Ret. $395

Dayna Communications EtherPrint



Best Connectivity Hardware

Affordable Ethernet connection for LocalTalk network printers
EtherPrint DP#150743
Sugg. Ret. $499

Sigma Designs L —*View Multi-Mode



Best Display Product

A breakthrough in Macintosh display technology
*L —*View Multi-Mode*
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Sugg. Ret. $1,999

Letraset ColorStudio 1.1



Best Color Prepress Program

Brings professional-quality color capabilities to the Mac
ColorStudio DP#242137
Sugg. Ret. $995

Farallon Timbuktu 3.1



Best Connectivity Software

Lets users transfer or exchange files and communicate with other users
Timbuktu 3.1 DP#185139
Sugg. Ret. $149

MicroNet Technology SBT-1288NP



Best Storage Product

1.3 Gigabyte hard disk subsystem with 6 ms access time
SBT-1288NP DP#254476
Sugg. Ret. $12,990

Honorable Mention **Claris** Claris FileMaker Pro 1.0/Data Management Product *DP#222050 Sugg. Ret. $299* • **Ashton-Tate** Full Impact/Data Management Product *DP#101095 Sugg. Ret. $295* • **Passport Designs** Encore 1.31/Music Product *DP#285914 Sugg. Ret. $595* • **Spectrum HoloByte** Welltris/Recreational Product *DP#347072 Sugg. Ret. $39.95* • **Lotus Development** Lotus MarketPlace/Data Resource *DP#112291 Sugg. Ret. $695* • **The Music Data Co.** (a division of Passport Designs) MIDI Records And MIDI Hits/Data Resource *DP#285916 Sugg. Ret. $479* • **Softsync/BLOC** Accountant, Inc. Professional 2.0/Financial Management *DP#341004 Sugg. Ret. $299.95* • **Quark** QuarkXPress 3.0/Page Design & Color Prepress *DP#135402 Sugg. Ret. $795* • **Frame Technology** FrameMaker 2.1/Page Design *DP#109801 Sugg. Ret. $995* • **Letraset** FontStudio 1.0/Typographic Program *DP#242131 Sugg. Ret. $595* • **Adobe Systems** Illustrator 3.0/Graphics Program *DP#106855 Sugg. Ret. $595* • **Zedcor** DeskPaint 3.03/Graphics Program *DP#126602 Sugg. Ret. $199.95* • **Claris** Claris CAD 2.0/CAD Software *DP#222046 Sugg. Ret. $899* • **Bright Star Technology** interFACE 1.0/Animation Program *DP#127508 Sugg. Ret. $499.95* • **International Business Software** Data Club 1.1/Workgroup Product *DP#219202 Sugg. Ret. $295* • **MacroMind** MacroMind Director 2.0/Multimedia Software *DP#243324 Sugg. Ret. $695* • **Farallon** MediaTracks 1.0/Multimedia Software *DP#185129 Sugg. Ret. $295* • **Dantz Development** Retrospect Remote 1.2/Connectivity Software *DP#159812 Sugg. Ret. $449* • **Shiva** NetModem V.32/Connectivty Hardware *DP#332703 Sugg. Ret. $1,999* • **Datadesk International** Switchboard/Input Device *DP#167528 Sugg. Ret. $239.95* • **Qume** CrystalPrint Express/Monochrome-Output Device *DP#305204 Sugg. Ret. $5,595* • **Texas Instruments** microLaser PS35/Monochrome-Output Device *DP#110802 Sugg. Ret. $2,849*

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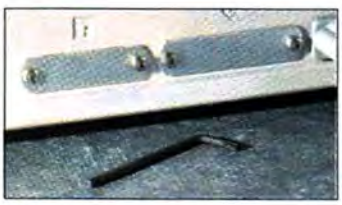
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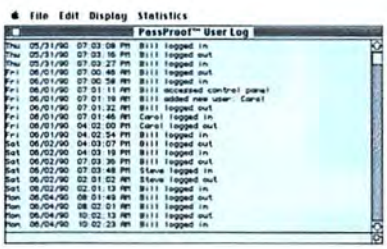


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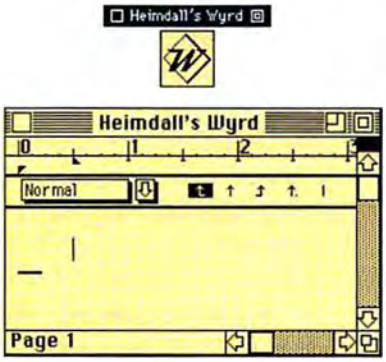


Figure 4: AltWDEF in action. An iconized window (top); and the new button on the far right of the title bar that "iconizes" it (bottom).

and Mac's Place who have forsaken packing peanuts for environmentally sound materials such as newspaper and popcorn. I hope other businesses will take the hint and start doing the same.

Uncovering the Trash

Q. When running an application under MultiFinder that has a window that covers the screen and that cannot be closed without quitting out of the application, how do you trash a file?

K. Millhone
Santa Barbara, CA

Andy: The first thing you need to do is call the manufacturer and give it a savage tongue-lashing for violating Apple's user-interface guidelines. If you live nearby, you may opt to kick over the firm's garbage cans.

As for a practical solution: If all you want to do is delete a file, you can do it with a DA such as DiskTop or DiskTools, which duplicates most of the Finder's functions. If you're dead set on using the Finder, get a copy of AltWDEF, a shareware cdev that "iconizes" a window, shrinking it out of the way when you're not using it (see Figure 4). I consider it Standard Operating Equipment for MultiFinder, where you often have a whole mess of overlapping windows.

AltWDEF is available on Zmac or from your local user group.

Bob: I don't care for AltWDEF. Although it works fine, it doesn't remember where you've placed your "iconized" windows after you reboot. So I use a different cdev, WindowShade (freeware — also available on Zmac or from your local user group), that lets you hide all of a window except its title bar. Same theory, different execution.

Unfortunately, some programs (and many games) don't create a true window — they just take over the entire screen, making the Apple menu inaccessible too. When this happens, nothing — neither AltWDEF, WindowShade, nor DiskTop — can help. In this case, a savage tongue-lashing of the manufacturer is indeed in order.

Andy: I personally prefer AltWDEF because it leaves a nice, friendly icon behind instead of a big, ugly stripe across your screen. But then again, *I've* never been quoted in the *Times*

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That Darned WDEF Virus

Q. Although I frequently scan my entire hard drive and all floppies with the antiviral programs SAM and Virex, I am plagued by a recurring warning that a strain of the WDEF virus has been found in the Desktop file of my drive. I have tried both deleting and repairing this file as well as scanning my hard disk after booting it from another disk. Still, every few days the strain appears again.

Andrea Martinez
Diamond Bar, CA

Bob: It sounds as though you've got an infected floppy disk somewhere, and every time you insert it, it reinfects your hard disk. Frequent scanning with SAM or Virex won't prevent you from getting reinfected; you'll also need to install SAM Intercept or the Virex INIT (one or the other). First use the SAM or Virex program to eradicate the virus. Then install either SAM Intercept or Virex INIT, and make sure it's set to automatically scan all floppy disks on insertion. That should keep you from getting reinfected.

The WDEF virus is the most virulent strain around. In fact, it's not even necessary to launch a program file for the infection to spread — merely inserting an infected disk is enough to infect all other mounted disks. It infects only the invisible Desktop file, and it rapidly spreads from disk to disk. Fortunately, you can eradicate the WDEF virus by rebuilding your desktop.

To do this, hold down the Command and Option keys when starting your Mac. Keep holding them down until you see the dialog box asking if you really want to rebuild the desktop. Click on OK. If you have more than one hard disk or multiple partitions, keep holding the Command and Option keys down until you've seen the dialog box for each drive.

Andy: WDEF (not to be confused with the AltWDEF cdev, of course!) is a wascal all right. In my opinion, however, the auto-scanning INITs are the only reason to choose a commercial virus-whomper over the shareware product Disinfectant (available from Zmac, etc.). Disinfectant's INIT automatically scans the System file at startup, but it doesn't automatically scan individual files, because it's designed to sense the *activity* (not the presence) of known viruses and block them from actually following through with their unholy machinations. Compared with commercial scanning INITs, Disinfectant's INIT is faster, less obtrusive, and just as effective in preventing infection.

You didn't say whether your Mac was part of a network or not, but I'll pass on a warning anyway. If someone on the network has mounted your hard disk as a remote volume, it's possible that your disk has become infected by a virus on that guy's hard disk, transmitted through the network. For this reason, any attempt at virus protection has to be applied to *all* the Macs on the network in order to be effective. Of course, if you install an auto-scanning INIT on every networked Mac, you'll eliminate the problem entirely.

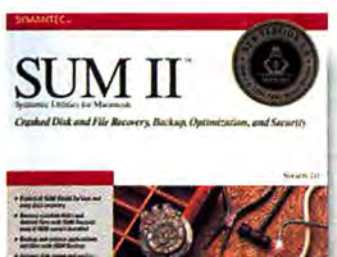


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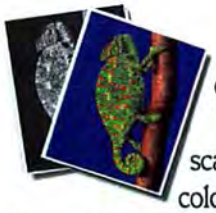
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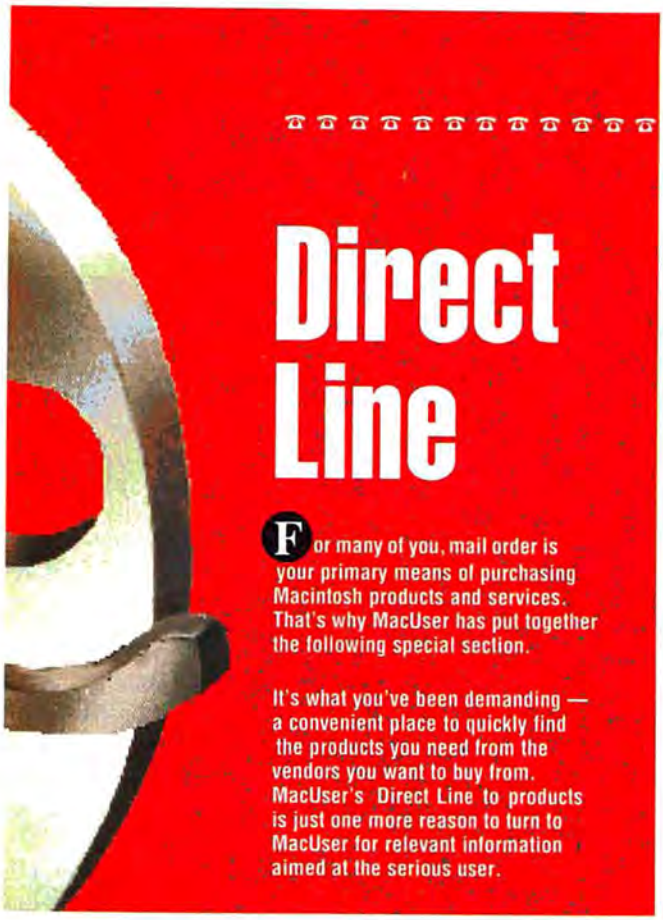
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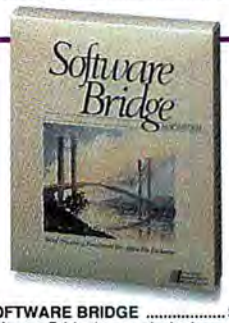
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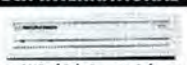
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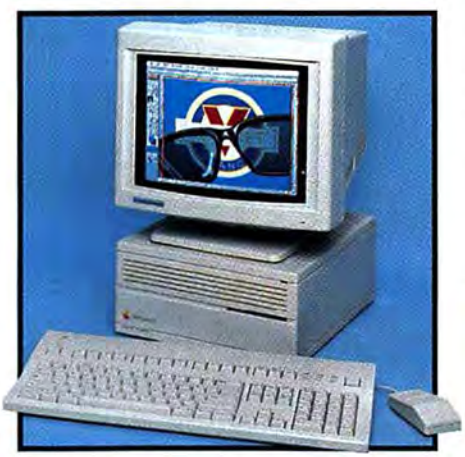
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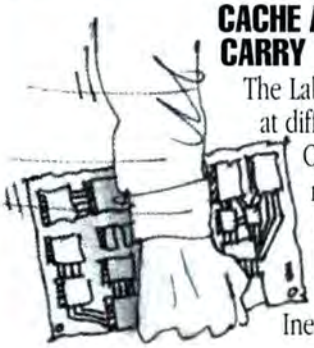
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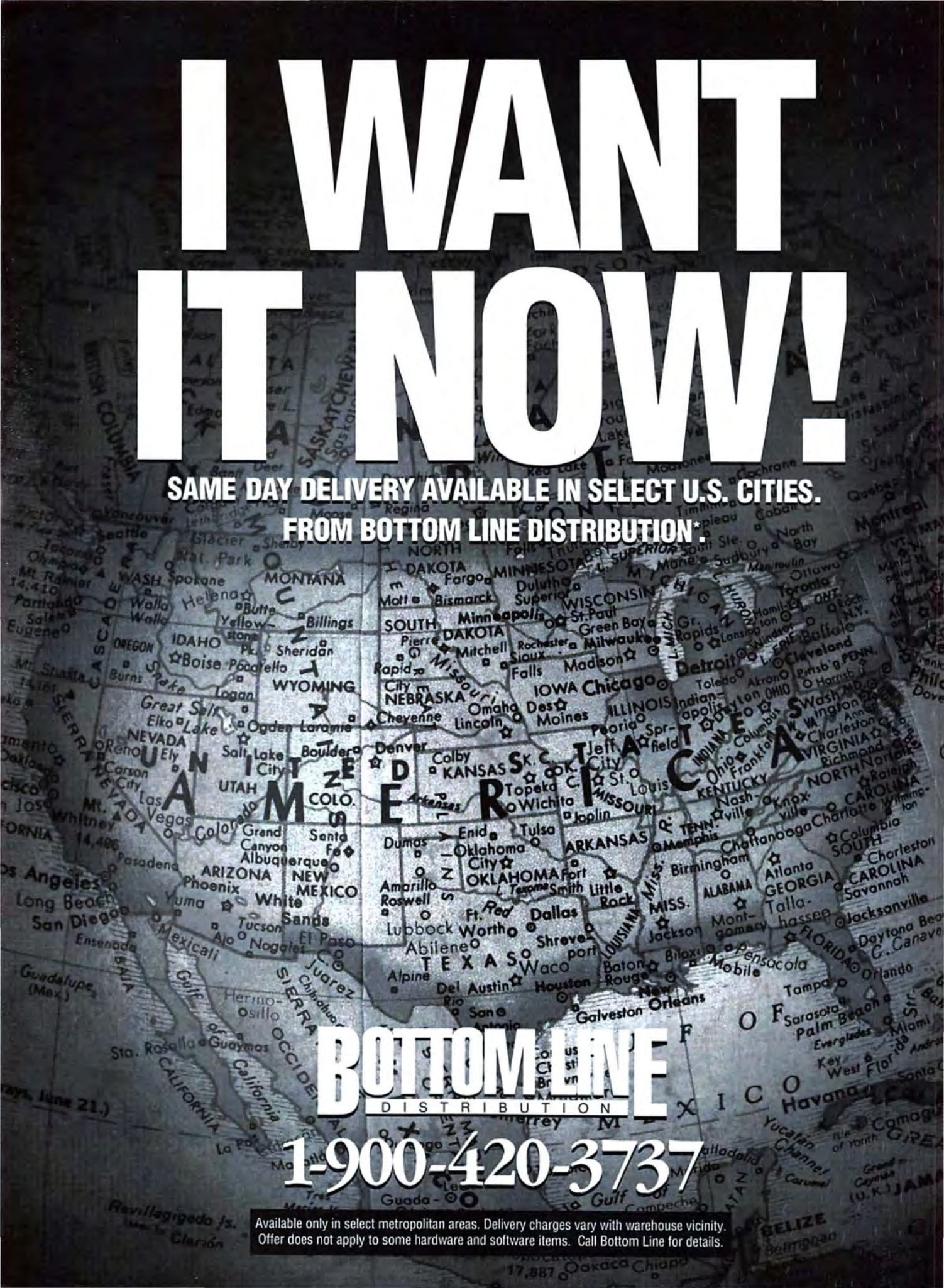
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- ☐ a) Mac Plus
- ☐ b) Mac SE
- ☐ c) Mac II
- ☐ d) IBM PC
- ☐ e) Other

2. For how many micro computers do you buy products?

- ☐ f) 1-4
- ☐ g) 5-49
- ☐ h) 50+

3. Your primary job function is: (check one)

- ☐ i) Administrative/General Management
- ☐ j) MIS/DP, Communications Systems, Programming
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- ☐ l) Finance/Accounting
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SOFTWARE	HARDWARE
☐ o) Accounting	☐ w) Mainframe
☐ p) Spreadsheets/ Financial Planners	☐ x) Mini
	☐ y) PC
☐ q) Project Managers	☐ z) Printers/Plotters
☐ r) Word Processors	☐ 1) Monitors
☐ s) Database Managers	☐ 2) Disk/Tape Back-up
☐ t) Graphics	☐ 3) Add-in Boards
☐ u) CAD/CAM	☐ 4) Communications
☐ v) Communications	

5. Are you involved in the purchasing of microcomputer equipment at your company?

- ☐ 5) Yes
- ☐ 6) No

6. If so, what function do you serve in the buying process?

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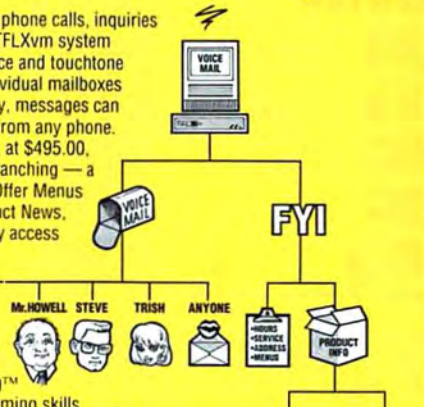


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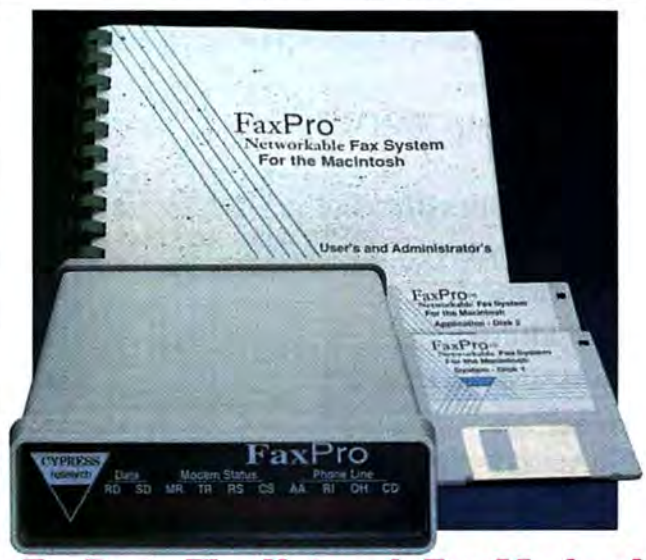
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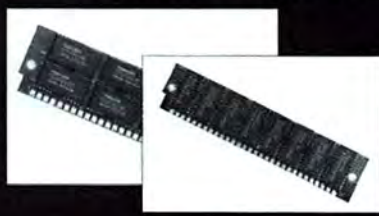
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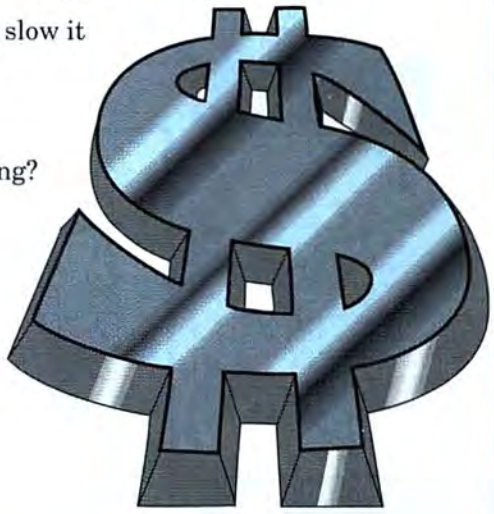
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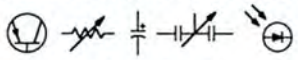
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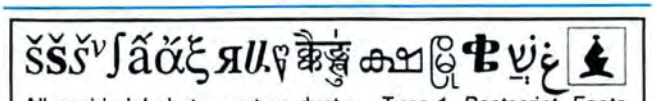


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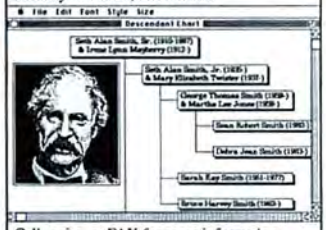
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Agnosiaphobia



A secret society of videophobes is conspiring to 'protect' you from the hidden hazards of your Mac.



Bill Safire's got nothing on me. In fact, here's a term he's probably doesn't know: **video agnosia** \vid-e-o ag-no-zha\ *n.* Pertaining to a condition whereby an individual cannot understand information displayed on a video device. The ailment is possibly genetic in origin. [<Lat.*videre* to see + [Lat.<Gk *agnosia*, ignorance]

And obscure as it sounds, this term describes a condition that affects us all.

Doctors say that video agnosia reflects deeper brain disorders that sometimes appear as other forms of agnosia, such as rock-and-roll agnosia, sexual agnosia, political agnosia, or the dreaded general agnosia — the inability to understand what the heck is going on at all. You know, the people who are zoned out and wander around in a daze.

While researching this little-known but, I suspect, common ailment, I happened upon a secret society known as the FYI (Friends of Yuri Ivanovitch). Ivanovitch was the first person fired from a job because of video agnosia. In 1956 he was working for Honeywell, monitoring computer activity on an old CRT (cathode-ray tube), and he kept seeing images of Czar Nicholas on-screen.

Paul Trudeau and John Collins, of St. Paul, Minnesota, both knew Ivanovitch, and coincidentally, both also suffered from this peculiar inability to see what is actually on a CRT. They determined that if the general public found out about this, the video agnosiacs would be ridiculed. That was in 1957, and that was when they formed the FYI.

Apparently, the FYI membership had secretly grown to 10,000 when Collins and Trudeau discovered an older group of general agnosiacs with a membership of 100,000 in Orange County, California. The older group, known only as The Club, had been formed around the turn of the century by the illustrious Blackjack Constable, a famous San Francisco gambling cheat who was on the lam. Constable knew that a segment of the population, like himself, had no understanding of what was going on. Every day some new technology — things such as bolts, for example — would frighten him.

Constable knew that the way to keep this handicap a secret was to form a group of like-minded associates — fellow agnosiacs. This group would work as a team and permeate all levels of decision making in both government and private industry.

After the two organizations became aware of each other, the FYI was incorporated into The Club as an SDG (special-disinterest group).

The FYI, DMV, and VDT

Agnosiacs have a special handshake or something — this hasn't been revealed to me — so they can identify each other. In this way they can promote each other to increasingly higher positions of authority. Once they've achieved authority, then it is up to them to resist all change.

An unnamed member of the FYI told me that most school boards, public-utility commissions, and publishing companies have been taken over by agnosiacs recently. "The auto industry was taken over a long time ago," he told me. "And never, never, whatever you do, trust anyone who belongs to a club." Then he hinted that, in California, the agnosiac central committee works within the structure of the Department of Motor Vehicles.

In order to work at all, agnosiacs must protect their identities. After discovering the existence of these underground organizations, I made it a point to identify characteristics of agnosiacs to perhaps ferret out a few.

Agnosia can't be cured. People with one form of agnosia are likely to exhibit other aberrations. Bad judgment crops up a lot. If a member of Congress is investigated for taking bribes, you'll notice that something else usually turns up, such as a penchant for enjoying the company of young goats.

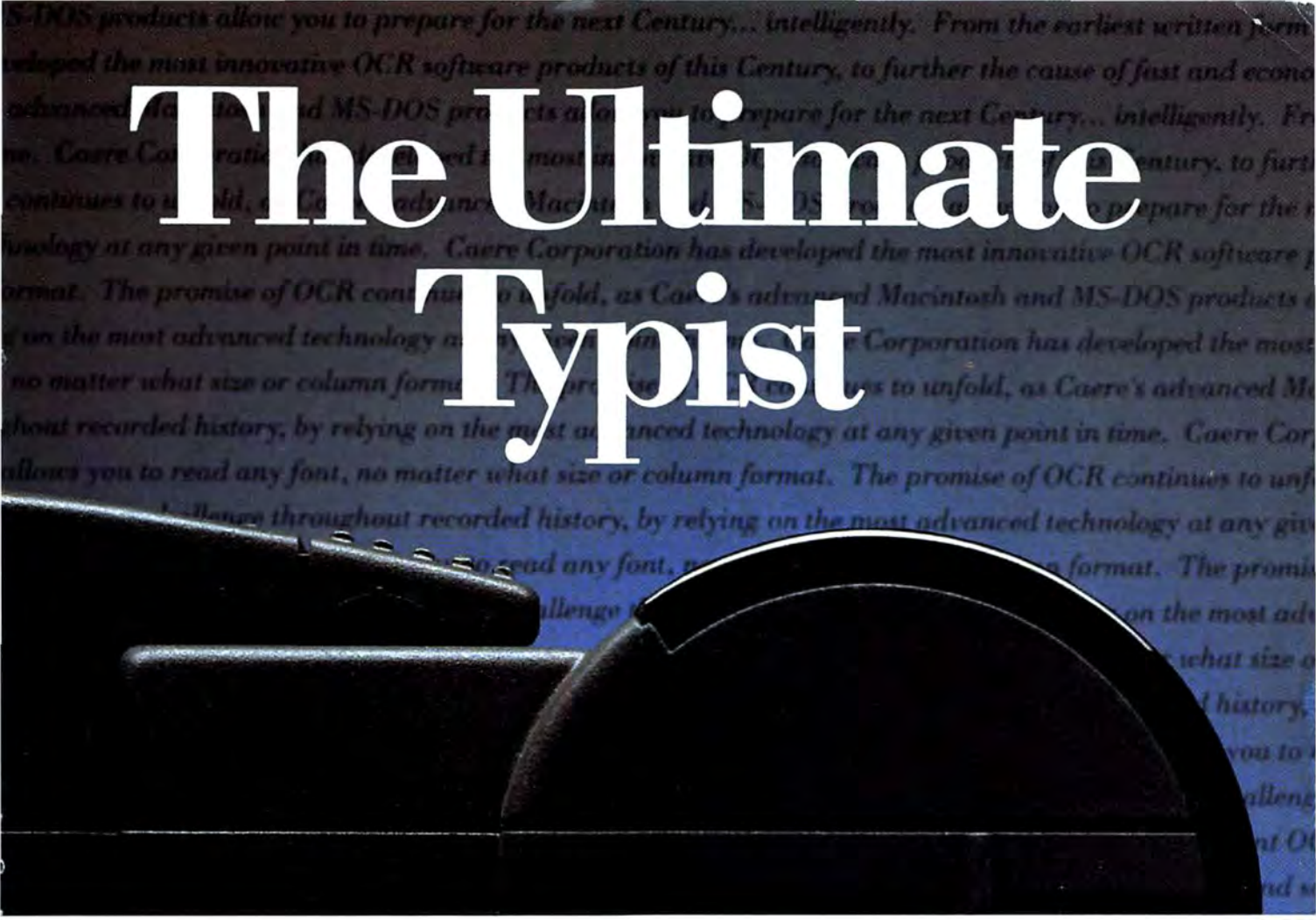
Agnosiacs generally do not like technology. They'll never have a computer anywhere around their desks. They claim that this is some sort of executive decision — it's demeaning to have a terminal on the desk. It's a coverup for agnosia. Be on the lookout.

Agnosiacs have no sense of humor. If they laugh at something, it's usually because they've practiced. Agnosiacs get together to decide something is funny, and then all of them pretend to laugh at it in public to allay suspicion. Don't be fooled by this ploy. Toss a one-liner at them and see how they react. Any attempt at ad-libbing a laugh will be preceded by a long pause of contemplation.

Agnosiacs stick together. This is their strength. It's up to normal people like you and me to stop creeping agnosia, eliminate agnosiacs from all positions of authority, and put them back where they belong — writing articles and legislation about the dangers of VDT screens.

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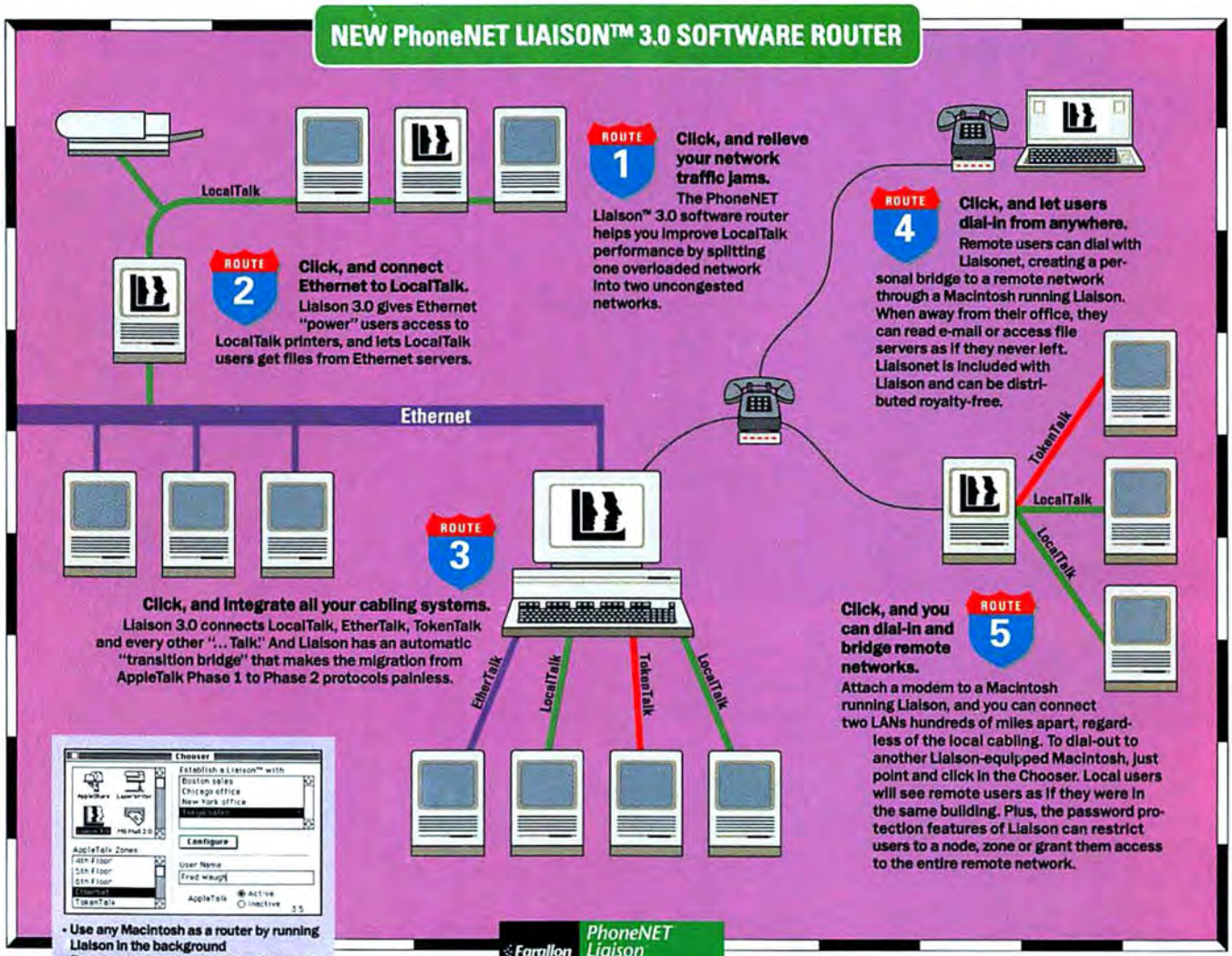
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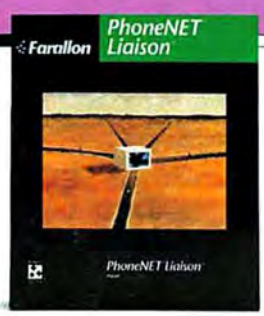
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